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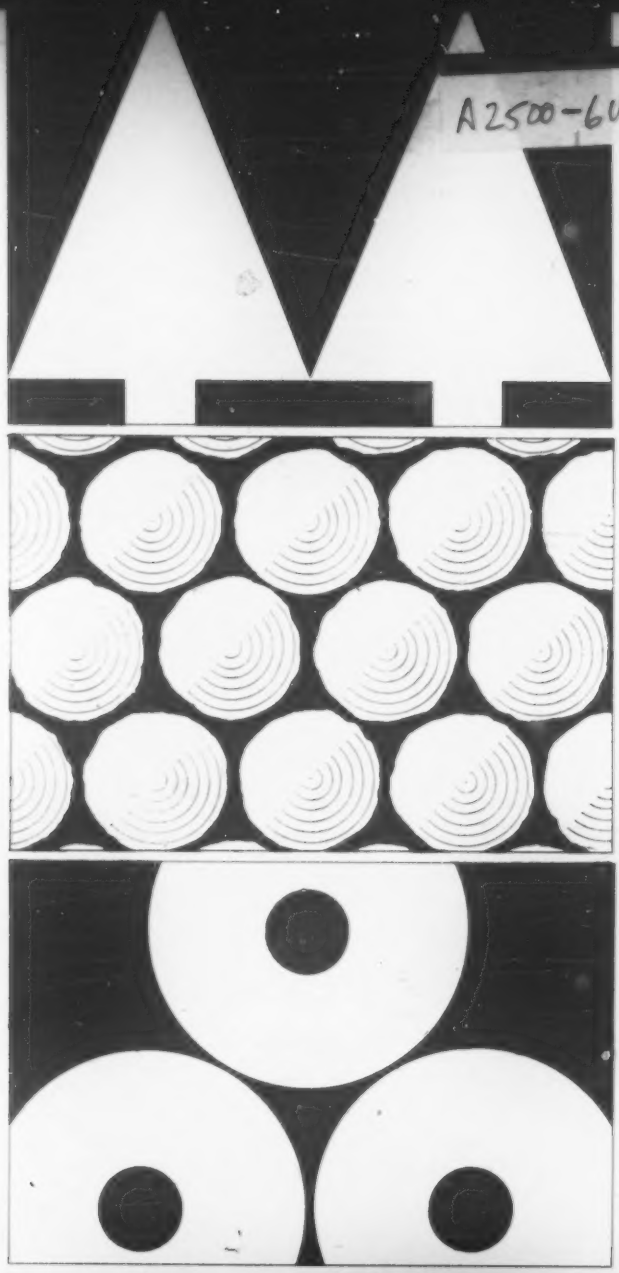

Paper Paperboard Wood Pulp Capacity

1987-1990
with additional data for 1991

Fiber consumption

American Paper Institute
December 1988

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Continuing long-term economic growth and the ensuing demand for paper and paperboard products, coupled with producers' competitiveness in global markets, are reflected in plans for new capacity. These plans include new mills and other improvements which will add a total of 8,249,000 tons of capacity to the industry manufacturing base in the three year period 1989-1991. This remarkable growth in capacity, financed by record capital outlays and unequalled in the last 20 years, will permit the industry to increase output of primary paper and paperboard at a 3.3% average annual rate and to reach a potential for 88,564,000 tons of production annually in 1991. During the same three year period, wood pulp capacity is reported to advance at a strong but somewhat slower annual growth rate of 2.6%. These planned improvements and new wood pulp mills will add 5,078,000 tons of capacity by 1991, bringing the industry capacity to 67,754,000 annual tons. Increased use of recyclable paper is also reported in this survey. Consumption, which totalled 19,770,000 tons in 1988, will reach 23,025,000 tons in 1991, if the industry operates at capacity in that year.

Anticipated high growth rates in industry capacity mark the second consecutive year in which producers have increased their year-earlier expansion plans. In our 1987 survey, capacity in 1990, was expected to reach 84.1 million annual tons for paper and paperboard and 64.4 million annual tons for wood pulp. Both of these estimates will now be exceeded by over one million annual tons in 1990 and strong growth will continue through 1991.

In last year's survey we commented on a differential between the growth rates in capacity for paper and paperboard and for wood pulp, the basic raw material for papermaking. This survey continues to reflect that trend. Wood pulp capacity, which comprised 79% of paper and paperboard capacity in 1986, is now estimated to decline by 2% to 77% in 1991. As reported last year, this development indicates plans to increase the utilization of recyclable paper, not the emergence of an industry fiber deficit. Also, wood pulp capacity can be increased rapidly in mills where potential pulp output is constrained to a level dictated by the capacity of the paper machine.

Note: Unless stated otherwise, all references to paper and paperboard and wood pulp exclude construction grades.

The American Paper Institute has conducted annual capacity surveys in the primary pulp and paper industry for the last thirty years. Over time, the scope of the surveys has expanded significantly and now includes responses from producers of more than 90% of total U.S. paper, paperboard and wood pulp.

The outline below is intended to clarify definitions and methodology and to assist the user in utilizing the capacity and raw materials data in the survey report.

- Capacity projects included in the survey are firm commitments. Such projects will usually be approved by senior management or boards of directors, have assured financing and, in many instances, will include site acquisition and signed contracts for machines or equipment.
- Published capacities for paper and paperboard represent potential for *primary finished production* before conversion into end products. Capacities for wood pulp are measured at a 10% moisture content. Consumption of pulp wood, recyclable paper and other fiber are "as received at mill".
- The definition of practical maximum capacity assumes normal operating conditions, full demand, adequate supplies or raw materials and available labor. The concept assumes that machines operate on an "all out" basis on their customary grade mix.
- Daily capacities are extrapolated to annual totals based on the maximum number of days each machine can operate in one year. Downtime, scheduled before the start of the year, other than due to lack of orders is excluded from capacity. Unscheduled downtime, is included.
  (Maximum operating days reported on pages 12 through 17 of this survey represent weighted averages of all machines in the industry).
- Capacity changes include the effect of new machine installations, rebuilds, shutdowns, revised operating schedules, grade and basis weight changes or other modifications to existing facilities. Changes also include grade reallocations on "swing" machines which reflect intermediate or long range market strategies and not short-term adjustments to market conditions which are often revised on a monthly basis.
- Capacities of "swing" or multiproduct machines are distributed on the basis of actual grade mix. For example, a swing machine in one year may be capable of producing 100,000 tons of unbleached kraft linerboard, if run exclusively on board, or 80,000 tons of unbleached kraft paper, if run exclusively on paper. If, in fact, the machine produces board for 75% of its operating year and paper for 25%, its capacity would be published as 75,000 tons of linerboard and 20,000 tons of paper. Planned changes in grade allocations (swings) in future years would be calculated in the same way.
- Capacities of dismantled or permanently inactive machines are removed from estimates immediately on shutdown. Capacities of other idled machines are removed after one year unless resumed operation is in prospect.
- Capacities of individual mills are directly related to verified levels of production.
- Edit procedures establish that types and quantities of fiber consumed in each mill are consistent with verified annual production.
- Inconsistencies in reported data are reconciled by direct contacts with company executives.
- Published capacities are grade totals summarized to regional and industry levels. Specific establishment data are not disclosed in the survey unless publicly announced by the respective companies.

TABLE 1:
GROWTH TRENDS IN CAPACITY

Thousands short tons

GRADES	ADDITIONS 1979-1988		ADDITIONS 1989-1991	
	10 YEAR INCREASE	AVERAGE ANNUAL GROWTH	3 YEAR INCREASE	AVERAGE ANNUAL GROWTH
TOTAL ALL GRADES PAPER & PAPERBOARD	**15,016**	**2.0%**	**8,266**	**3.2%**
TOTAL PAPER & PAPERBOARD	**17,223**	**2.4**	**8,249**	**3.3**
TOTAL PAPER	**9,739**	**2.8**	**4,432**	**3.5**
NEWSPRINT	2,012	4.1	1,001	5.2
PRINTING & WRITING	7,498	4.0	2,823	3.9
PACKAGING & IND. CONV	(752)	(1.3)	137	0.8
TISSUE	982	1.9	470	2.7
TOTAL PAPERBOARD	**7,485**	**2.1**	**3,817**	**3.1**
UNBLEACHED KRAFT	5,120	3.0	2,423	3.9
SOLID BLEACHED	482	1.1	306	2.1
SEMICHEMICAL	1,057	2.0	573	3.2
RECYCLED	826	0.9	515	1.8
CONSTRUCTION GRADES	**(2,207)**	**(6.9)**	**17**	**0.3**
TOTAL ALL GRADES WOOD PULP	**10,864**	**1.9%**	**5,143**	**2.6%**
TOTAL WOOD PULP (excluding pulp for Construction Paper & Board)	**11,888**	**2.1**	**5,078**	**2.6**
DISSOLVING & SPECIAL ALPHA	(172)	(1.2)	1	—
SULFITE	(506)	(2.7)	2	—
SULFATE & SODA*	10,528	2.5	3,885	2.6
SEMICHEMICAL	202	0.4	298	2.0
MECHANICAL	1,835	3.4	893	4.4
WOOD PULP FOR CONSTRUCTION PAPER & BOARD	**(1,024)**	**(7.3)**	**65**	**2.3**

*includes screenings

Not adjusted for rounding differences.

Grade Breakouts

Table I contrasts planned capacity increases for the three years 1989 through 1991 for each of the major grades of paper, paperboard and wood pulp with actual growth in capacity for the same grades over the preceding ten-year period.

- Capacity for printing and writing papers, mostly uncoated free sheet, coated groundwood and coated free sheet papers, is expected to grow at a high 3.9% average annual rate.
- Planned additions to newsprint capacity will total one million tons annually and will yield an exceptionally high rate of growth averaging 5.2% annually through 1991.
- Benefitting from the installation of five new machines between 1989 and 1991, capacity for tissue papers is expected to grow at a 2.7% average annual rate. The secular growth in capacity for tissue papers has averaged 1.9% annually over the past ten years.
- Following a significant 436,000 ton capacity reduction in 1987 and 1988, which continues a long-term trend, capacity for unbleached kraft packaging papers will increase by a modest 71,000 annual tons in the two years 1990 and 1991.
- Domestic demand for corrugated shipping containers and off-shore demand for U.S. containerboard has been at record levels throughout the 1986-1988 period. As a result, producers of unbleached kraft and semichemical paperboard now plan to increase capacity at rates considerably higher than achieved at any point during the previous decade.
- Capacity for solid bleached and recycled paperboard is expected to grow at rates averaging 2.1% and 1.8% annually in the three year period 1989 through 1991.
- Although no greenfield mills are included in this survey, capacity for market wood pulp was increased by 839,000 annual tons in 1987 and 1988. Future expansion, planned for 1989 through 1991 will add an additional 525,000 tons annually. Together, these increases will achieve a 17% capacity gain over the 1987-1991 period, higher than in any recent five-year period.
- Planned additions to capacity for sulfate and soda paper grade pulps, which now comprise more than 75% of all wood pulp produced in the U.S., should increase capacity at a 2.6% annual average rate from 48,496,000 tons in 1988 to 52,381,000 tons in 1991.

Fiber Consumption

The solid gains in production of paper and paperboard achieved during 1987 and 1988 are mirrored in similar increases in the industry's consumption of fibrous raw materials as furnish for papermaking. Table 4 shows consumption of 77,374,000 tons of fibers in 1987 comprised a 4.5% increase over 1986 and the expected consumption of 80,164,000 tons this year will represent an additional 3.6% increase. In anticipation of further production increases, producers report plans to consume 90,004,000 tons of fiber in 1991.

Consumption of recyclable paper, as a component of total fibers, will increase share from 24.4% in 1987 to 25.6% in 1991. This 5% share gain continues the increasing use of recyclable paper as furnish for papermaking. However, wood pulp manufactured from secondary materials, including manufacturing and forest wastes, will decline by 1% and secondary fibers will remain at 55% of total raw materials consumption over the next three years.

TABLE 2:
ANNUAL CAPACITIES 1970-1991

Thousands short tons

YEAR	ANNUAL CAPACITY		CAPACITY ADDITIONS DURING YEAR		PERCENT INCREASE	
	PAPER & PAPERBOARD	ALL GRADES	PAPER & PAPERBOARD	ALL GRADES	PAPER & PAPERBOARD	ALL GRADES
1970	53,260	57,195	1,140	1,221	2.2%	2.2%
1971	54,136	58,141	876	946	1.6	1.7
1972	55,873	59,965	1,671	1,824	3.1	3.1
1973	58,164	62,284	2,291	2,319	4.1	3.9
1974	59,527	63,779	1,363	1,495	2.3	2.4
1975	60,140	64,369	613	590	1.0	0.9
1976	61,307	65,673	1,167	1,304	1.9	2.0
1977	62,004	66,459	697	786	1.1	1.2
1978	63,091	67,419	1,087	960	1.8	1.4
1979	64,615	69,033	1,524	1,614	2.4	2.4
1980	66,368	70,716	1,753	1,683	2.7	2.4
1981	68,172	72,255	1,804	1,539	2.7	2.2
1982	70,086	73,118	1,914	863	2.8	1.2
1983	71,126	74,017	1,040	899	1.5	1.2
1984	73,098	75,943	1,972	1,926	2.8	2.6
1985	74,301	76,622	1,203	679	1.6	0.9
1986	75,777	77,921*	1,476	1,299	2.0	1.7
1987	78,186	80,341	2,409	2,420	3.2	3.1
1988E	80,315	82,435	2,129	2,094	2.7	2.6
1989E	82,568	84,685	2,253	2,250	2.8	2.7
1990E	85,427	87,553	2,859	2,868	3.5	3.4
1991E	88,564	90,701	3,137	3,148	3.7	3.6

E — Estimate

TABLE 3:
COMPARISON OF CAPACITY ESTIMATES
FOR TOTAL PAPER & PAPERBOARD

Thousands short tons

SURVEY PUBLISHED IN:	ESTIMATES							
	1983	1984	1985	1986	1987	1988	1989	1990
1982	71,155	72,455	73,806					
1983	70,814	71,965	73,054	74,084				
1984	71,126*	72,749	73,700	74,973	76,317			
1985		73,098*	74,304	75,803	77,708	78,768		
1986			74,301*	75,618	77,383	78,777	79,836	
1987				75,777*	78,021	79,799	81,847	84,104
1988					78,186*	80,315	82,568	85,427
WIDEST DEVIATION FROM ACTUAL	0.4%	1.6%	1.7%	2.3%	2.4%			
WIDEST RANGE						2.0%	3.4%	1.6%

*Actual

TABLE 4:
FIBER SOURCES FOR PAPER & PAPERBOARD MANUFACTURE

Thousands short tons

GRADES	1987		1988	1989	1990	1991	
	ANNUAL TONS	PERCENT	ANNUAL TONS	ANNUAL TONS	ANNUAL TONS	ANNUAL TONS	PERCENT
TOTAL CONSUMPTION	**77,374**	**100.0**	**80,164**	**82,843**	**86,395**	**90,004**	**100.0**
PRIMARY FIBERS							
WOOD PULP	34,950	45.2	36,098	37,022	38,209	40,506	45.0
SECONDARY FIBERS	**42,424**	**54.8**	**44,066**	**45,821**	**48,186**	**49,498**	**55.0**
WOOD PULP	23,203	30.0	23,965	24,578	25,472	26,116	29.0
RECYCLABLE PAPER*	18,901	24.4	19,770	20,894	22,359	23,025	25.6
OTHER	320	0.4	331	349	355	357	0.4

Note: Consumption for 1990-1991 assumes capacity levels of production.

**Includes the following tonnage consumed in the manufacture of molded pulp products: 1987, 207,000 tons; 1988, 209,000 tons; 1989-1991, 225,000 tons.*

TABLE 5:
NORTH AMERICAN NEWSPRINT CAPACITY — ANNUAL BASIS

Thousands short tons	1988	1989	1990	1991	3 YEAR INCREASE	
					TONS	PERCENT
U.S.	6,116	6,301	6,877	7,117	1,001	16.4
Canada*	11,199	11,607	12,345	12,781	1,582	14.1
North America	17,315	17,908	19,222	19,898	2,583	14.9
Percent Change	2.2	3.4	7.3	3.5		

*Canadian Pulp & Paper Association. Newsprint Year Book 1987 plus a subsequently announced project estimated at 165,000 tons in 1990 & 198,000 tons in 1991

PAPER GRADES

Newsprint

As previously noted, newsprint capacity is expected to increase sharply from 6,116,000 annual tons in 1988 to 7,117,000 tons in 1991. The basis for this growth will include the construction of three greenfield mills and the installation of a large new machine in an existing mill. These new facilities, which will be brought into production in 1989 and 1990, will end a six year low-growth period in which no new machines were installed and capital expenditures were concentrated on product improvement.

Any analysis of newsprint availability in the U.S. must include capacity plans in Canada, the world's largest newsprint producer and the source of more than 50% of U.S. domestic consumption. Table 5 shows that Canadians also plan to expand capacity at near-record levels with a three-year net increase totaling 1,582,000 annual tons. The combined North American capacity will near 20,000,000 tons annually in 1991 and, if additional projects under active consideration in both countries are finalized, this level could be even higher.

Printing and Writing Papers

Following a long-established trend, above average growth is reported for printing and writing papers. Capacity will increase by 2,823,000 annual tons from a potential to produce 23,064,000 tons in 1988 to an estimated level of 25,887,000 tons in 1991. In that year, printing and writing paper capacity should grow to 29.2% of all paper and paperboard capacity, compared to 24.7% in 1978.

Uncoated free sheet, the largest printing and writing category, will provide 1,283,000 tons or 45% of the total expansion. Projects for this grade include at least three new paper machines, one in a new mill, as well as several other major expansions. Capacity for coated free sheet, a smaller grade category, is estimated to increase by 990,000 annual tons, at a rate average 8.8% annually over the 1989-1991 period.

Future expansion in capacity for uncoated groundwood papers is planned at a rate averaging 3.4% per year, more than double the historical 1.6% growth rate for this grade and, in a departure from trend, expansion for coated groundwood papers will slow to a rate averaging 2.4% annually, well below its long-term 6% rate of increase.

Unbleached Kraft Packaging Paper

In previous surveys, we have commented on eroding market conditions for unbleached kraft packaging papers that have forced producers to shut down manufacturing plant or to convert machines to produce other grades. As a result of these reductions, capacity for unbleached kraft papers has declined by 644,000 tons, or a full 15%, between 1978 and 1986. This trend continued in 1987 and 1988 with the conversion of 300,000 annual tons of capacity to produce printing and writing and bleached packaging papers, and with more than 150,000 annual tons of swing capacity shifted to unbleached kraft linerboard in the same two-year period. For the remaining years covered by this survey, capacity is expected to increase by 73,000 annual tons mostly from the installation of a new machine in 1990, and partly offset by the shutdown of a smaller machine in early 1991.

Tissue

Capacity figures for 1987 have been revised downward by 150,000 annual tons as a result of data received in this year's survey. After adjusting to the new base, capacity for 1988 increased 121,000 tons. In addition, five new machines and other improvements will add a further 470,000 annual tons in the three years 1989 through 1991.

PAPERBOARD GRADES

Unbleached Kraft and Semichemical Paperboard

Committed additions to capacity for unbleached kraft paperboard total 2,423,000 annual tons and capacity is estimated to increase at a strong 3.9% annual rate to reach 22,597,000 tons in 1991. These planned additions exceed producers' year-earlier estimates and will add, in one three-year period, new capacity equal to almost one-half of the total increase of 5 million tons achieved

over the previous ten years. Perhaps the most interesting aspect of the expansion is the extent to which machine rebuilds, installations of extended high-intensity presses and other miscellaneous improvements, spread across the entire industry, will account for more than two-thirds of the total gain. Only three new machine installations are planned, and these will supply less than one-third of the total.

Growth in capacity for semichemical corrugating medium, at a yearly rate averaging 3.2%, will also exceed its historical average of 2.0% annually.

Solid Bleached Paperboard

The principal end use for solid bleached paperboard, as packaging for solid and liquid foods, has faced rigorous competition from alternative packaging materials. Consequently, capacity growth has been severely restricted. Over the last nine years, net additions to capacity have totalled only 538,000 annual tons or less than 13%. In 1988, capacity for bleached board will actually decline by 56,000 annual tons as some facilities are diverted to produce market wood pulp and bleached bristols.

For the oncoming three years, a considerably higher level of capacity expansion is planned with a net gain of 306,000 annual tons anticipated. Although no new mills or machines are reported, two major improvement projects, each in excess of 100,000 annual tons, as well as several smaller projects will contribute to this increase. These gains will be partially offset by the conversion, in 1990, of a 50,000 ton per year bleached paper and paperboard machine to produce uncoated free sheet papers.

Recycled Paperboard

More than any other industry segment, producers of recycled paperboard have been forced to shut down mills and machines that could no longer be operated profitably in competitive markets. In a ten-year period from 1976 to 1986 more than 53 machines with capacities totaling almost 2 million annual tons were shut down or dismantled and net gains in capacity were held to only 234,000 tons or less than 0.3% per year.

In the last two years, improved markets have encouraged capital investments that have yielded 460,000 annual tons of new capacity. In the next three years, planned additions will total 515,000 annual tons and capacity should reach 9,983,000 tons in 1991. The container grades, linerboard and especially corrugating medium, will account for 348,000 tons, or 68%, of this total.

In addition to the committed expansions included in this report, several large projects are under active study. These include the construction of major new mills and the restart of an idle facility upgraded with state-of-the-art technology.

RECYCLABLE PAPER

For the base year 1987, total consumption at U.S. mills was 18,901,000 tons. By 1991, assuming the industry continues to operate at, or near, capacity, consumption is projected to be 23,025,000 tons. This represents an increase of 4,124,000 tons.

Consumption, by 1991, of old corrugated containers will increase by 26% and move from 49% to 50% of the total consumption. Waste newspapers and high quality wastes, including pulp substitutes and deinking grades, will each increase by 19% by 1991. Consumption of mixed paper waste will increase, although at a somewhat slower rate.

WOOD PULP

Dissolving and Sulfite Pulps

Production of both dissolving and sulfite paper grade pulps has been in a long standing period of decline. Capacity for dissolving pulps, used in textile manufacture and in other nonpaper uses, has been reduced by 172,000 annual tons over the last ten years. Most of this reduction has involved diversions of capacity to the production of paper grade pulps. In the same ten-year period, capacity for sulfite pulps has been reduced by 506,000 annual tons and most of this loss has represented mills that have been permanently shut down or dismantled. Producers of both of these wood pulp grades report that capacity will remain unchanged over the three future years covered in this survey.

Market Pulp

After strong back-to-back annual increases of 5.8% in 1987 and 4.4% in 1988, capacity growth for market wood pulp in the next three years is planned at a rate expected to average 1.9% annually. This new capacity, which includes two major projects, each in excess of 200,000 annual tons, will total 525,000 annual tons and bring the industry potential to 9,403,000 tons in 1991. These significant increases were not anticipated in last year's survey.

Sulfate and Soda Pulps

Capital expenditures intended to enlarge the output and improve the quality of the industry's wood pulp mills will increase capacity for sulfate and soda pulps by 3,885,000 annual tons in the years 1989-1991. Capacity for bleached and semibleached grades will increase by 2,321,000 annual tons, while capacity for unbleached grades will increase by the remaining 1,564,000 tons. Expansion projects include new mills and new pulp lines in existing mills which, together, will provide 2 million tons of new capacity, augmented by miscellaneous improvements which will account for an additional 1.9 million annual tons. In all, more than 100 separate expansion projects will contribute to the industry growth.

Dick Storat

Richard E. Storat
Vice President,
Economic and Financial Services

December 1988

Paper & Paperboard

capacity summary annual

Practical Maximum Basis
Thousands short tons

GRADES	1987	1988	1989	1990	1991*
TOTAL ALL GRADES	**80,341**	**82,435**	**84,685**	**87,553**	**90,701**
Total Paper & Paperboard	**78,186**	**80,315**	**82,568**	**85,427**	**88,564**
Total Paper	**39,080**	**40,199**	**41,439**	**43,106**	**44,631**
NEWSPRINT	6,006	6,116	6,301	6,877	7,117
PRINTING WRITING & RELATED	22,077	23,064	23,971	24,838	25,887
Uncoated Groundwood	1,653	1,696	1,762	1,765	1,875
Coated Groundwood	4,136	4,376	4,478	4,659	4,704
Coated Free Sheet	3,229	3,456	3,731	4,019	4,446
Uncoated Free Sheet	11,493	11,897	12,352	12,721	13,180
Cotton Fiber	198	200	201	201	201
Thin Papers	290	277	279	279	279
Solid Bleached Bristols	1,079	1,161	1,168	1,193	1,202
PACKAGING & IND. CONV.	5,492	5,394	5,410	5,445	5,531
Unbleached Kraft	3,295	3,143	3,145	3,184	3,216
Bleached Packaging & Ind. Conv.	501	527	529	483	479
Specialty Packaging	565	585	590	618	667
Special Industrial	1,131	1,138	1,146	1,160	1,169
TISSUE	5,505	5,626	5,757	5,946	6,096
Total Paperboard	**39,106**	**40,116**	**41,128**	**42,321**	**43,933**
UNBLEACHED KRAFT	19,421	20,174	20,675	21,439	22,597
of which Kraft Linerboard	17,949	18,613	19,084	19,796	20,783
SOLID BLEACHED	4,735	4,679	4,715	4,815	4,985
SEMICHEMICAL	5,682	5,796	5,987	6,160	6,369
RECYCLED	9,267	9,468	9,752	9,907	9,983
Total Construction Paper & Board and Other	**2,155**	**2,120**	**2,117**	**2,126**	**2,137**

*Capacity additions presented here for 1991 include only presently known commitments and do not necessarily represent final expansion plans of the industry for that year.

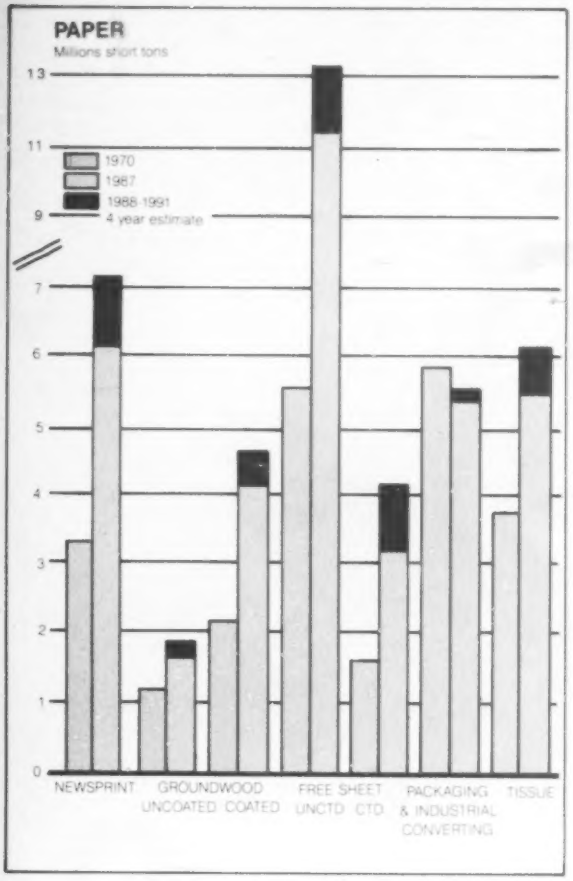
Totals not adjusted for rounding differences

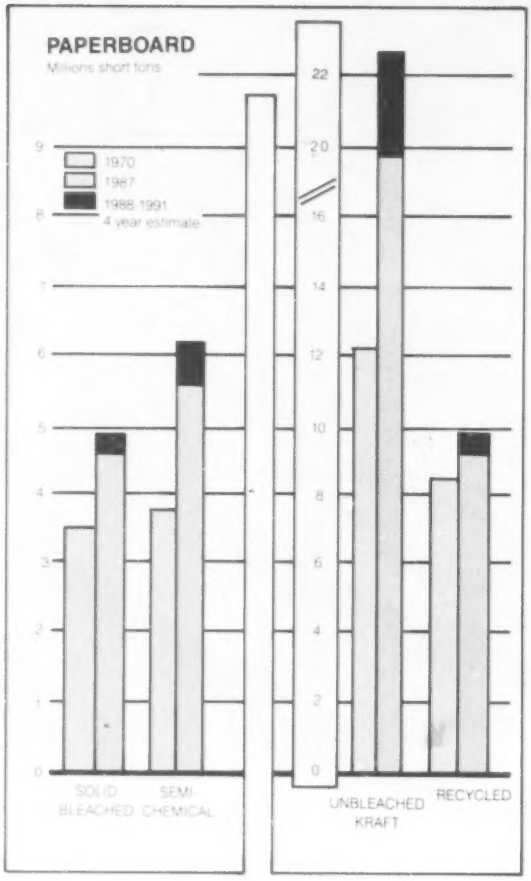
capacity reductions

paper and paperboard mills and machines shut down

Grades	1971-1975 Number of Machines	1971-1975 Number of Complete Mills	1971-1975 Annual Capacity	1976-1980 Number of Machines	1976-1980 Number of Complete Mills	1976-1980 Annual Capacity
TOTAL	**135**	**39**	**2,482**	**163**	**53**	**3,990**
Paper						
Newsprint	—	—	—	3	1	231
Printing, Writing & Related	51	8	803	32	5	550
Pkg. & Ind. Conv.	35	8	290	32	7	395
Tissue	6	4	52	25	8	246
Paperboard						
Unbleached Kraft	2	—	128	2	1	400
Solid Bleached	1	—	33	2	1	162
Semichemical	3	1	123	4	1	178
Recycled	29	14	872	35	12	1,295
Construction Paper & Board & Other	8	4	181	28	17	533

capacity/annual growth comparison





Thousands short tons

Grades	1981-1985* Number of Machines	Number of Complete Mills	Annual Capacity	1986-1991* Number of Machines	Number of Complete Mills	Annual Capacity Removed from Survey	Annual Capacity Not Removed from Survey
TOTAL	**222**	**88**	**6,228**	**51**	**8**	**1,843**	**225**
Paper							
Newsprint	5	—	360	—	—	—	—
Printing, Writing & Related	38	4	771	18	2	305	122
Pkg. & Ind. Conv.	31	7	821	9	2	515	—
Tissue	30	13	308	12	2	80	68
Paperboard							
Unbleached Kraft	5	—	742	3	—	602	—
Solid Bleached	—	—	—	2	—	142	—
Semichemical	7	2	553	1	—	100	—
Recycled	18	12	644	4	1	77	35
Construction Paper & Board & Other	88	50	2,029	2	1	22	—

Shutdowns represent machines and mills reported to the API as permanent or indefinite closures and have been removed from capacity totals. Not all of the facilities have been dismantled and some portion of their productive capacity could be restored.

**Includes machines converted to produce other grades.*

capacity summary annual

Practical Maximum Basis
Thousands short tons

GRADES	1987	1988	1989	1990	1991*
TOTAL ALL GRADES WOOD PULP	**62,076**	**63,578**	**64,762**	**66,589**	**68,721**
Total Wood Pulp (exc. pulp for Construction Paper & Board)	**61,172**	**62,676**	**63,860**	**65,657**	**67,754**
DISSOLVING	1,389	1,401	1,402	1,402	1,402
CHEMICAL PAPER GRADES	48,825	50,082	50,934	52,206	53,968
SULFITE PAPER GRADES	1,646	1,589	1,592	1,593	1,591
SULFATE & SODA PAPER GRADES	47,179	48,492	49,342	50,613	52,377
Bleached & Semibleached Softwood	13,623	13,939	14,102	14,415	14,899
Bleached & Semibleached Hardwood	11,823	12,269	12,679	13,177	13,629
Unbleached	21,733	22,285	22,561	23,022	23,849
SEMICHEMICAL	4,697	4,774	4,875	4,996	5,072
MECHANICAL	6,256	6,415	6,644	7,048	7,308
SCREENINGS	6	4	4	4	4
Total Wood Pulp for Construction Paper & Board†	**904**	**902**	**902**	**932**	**967**

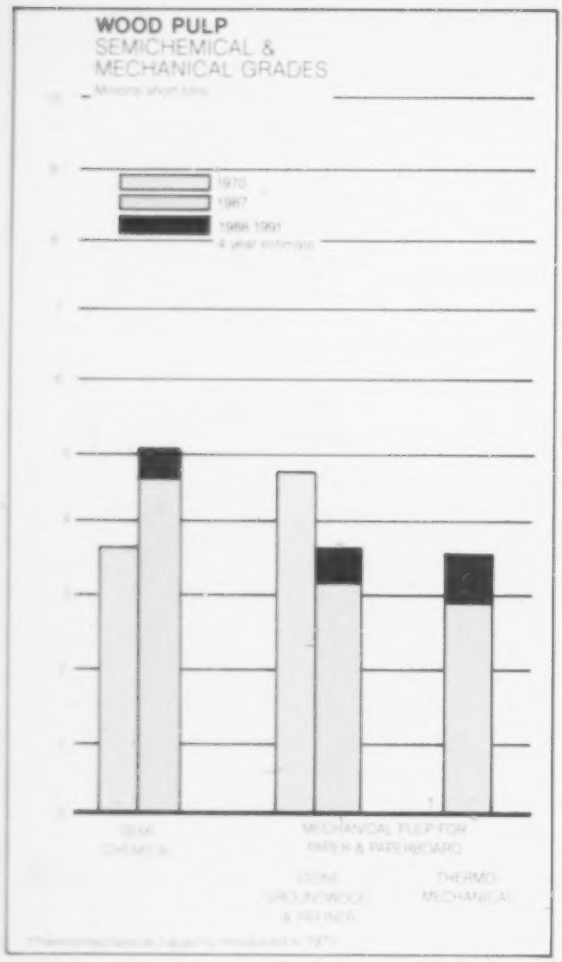
TOTAL MACHINE DRIED WOOD PULP	**10,744**	**11,009**	**11,002**	**11,234**	**11,494**
DISSOLVING	1,394	1,401	1,402	1,402	1,402
CHEMICAL PAPER GRADES	9,230	9,488	9,480	9,712	9,972
SULFITE PAPER GRADES	412	416	416	416	416
SULFATE & SODA PAPER GRADES	8,818	9,072	9,064	9,296	9,556
Bleached & Semibleached Softwood	5,428	5,586	5,578	5,728	5,972
Bleached & Semibleached Hardwood	3,223	3,304	3,306	3,388	3,404
Unbleached	168	182	180	180	180
ALL OTHER	120	120	120	120	120

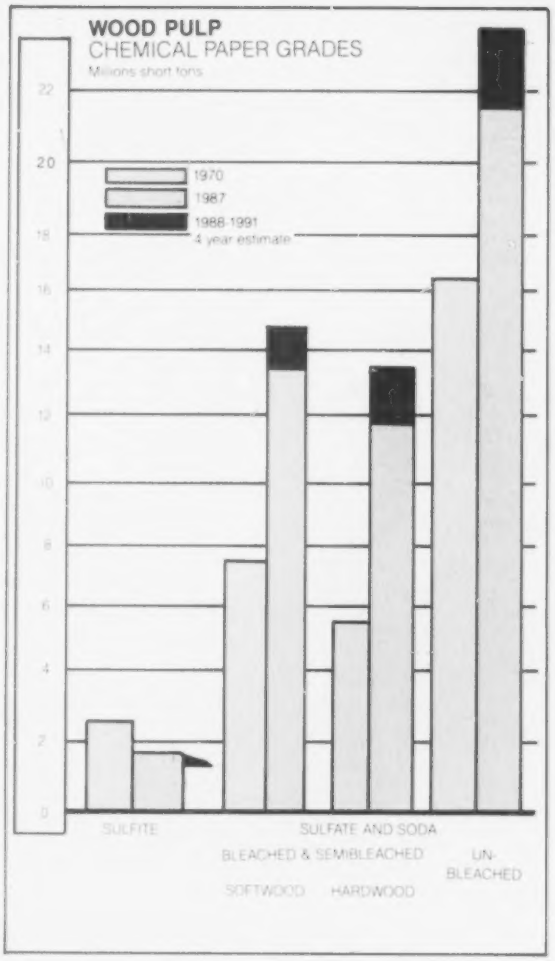
*Capacity additions presented here for 1991 include only presently known commitments and do not necessarily represent final expansion plans of the industry for that year.

†Excludes the defibrated/exploded pulp capacity of mills that produce hard pressed board.

Totals not adjusted for rounding differences.

capacity/annual growth comparison





market wood pulp

capacity summary annual

GRADES	1987	1988	1989	1990	1991*
TOTAL MARKET WOOD PULP	**8,505**	**8,878**	**8,940**	**9,188**	**9,403**
DISSOLVING	1,388	1,401	1,402	1,402	1,402
CHEMICAL PAPER GRADES	7,103	7,462	7,524	7,772	7,988
SULFITE PAPER GRADES	284	285	285	285	285
SULFATE & SODA PAPER GRADES	6,819	7,178	7,239	7,487	7,703
Bleached & Semibleached Softwood	4,019	4,117	4,143	4,298	4,510
Bleached & Semibleached Hardwood	2,632	2,878	2,915	3,009	3,013
Unbleached	168	183	181	180	180
ALL OTHER	14	14	14	14	14

Based on information provided by producers. Reflects diversion of drying capacity to and from own use, installation of new equipment and retirement of existing equipment.

Totals not adjusted for rounding differences.

**Capacity additions presented here for 1991 include only presently known commitments and do not necessarily represent final expansion plans of the industry for that year.*

Paper By Grade

capacity/annual • year end • daily

	ALL GRADES PAPER & PAPER-BOARD Total	PAPER & PAPER-BOARD Total		Practical Maximum Basis Thousands short tons	PAPER Total	NEWS-PRINT Total	Total	Uncoated Ground-wood
ANNUAL CAPACITY 1987-1991	**90,341**	**78,186**	**1987**	**Annual Capacity**	**39,080**	**6,006**	**22,077**	**1,653**
Annual Capacity includes changes in capacity only for the portion of the year in which they are actually effective	387	387		New Machines	387	—	304	127
	1,707	1,742		Net Improvements	732	110	683	(83)
	82,435	**80,315**	**1988**	**Annual Capacity**	**40,199**	**6,116**	**23,064**	**1,696**
	668	668		New Machines	651	122	439	41
	1,581	1,583		Net Improvements	589	63	468	24
	84,685	**82,568**	**1989**	**Annual Capacity**	**41,439**	**6,301**	**23,971**	**1,762**
	1,230	1,230		New Machines	1,093	516	392	10
	1,639	1,630		Net Improvements	573	60	475	(7)
	87,553	**85,427**	**1990**	**Annual Capacity**	**43,106**	**6,877**	**24,838**	**1,765**
	1,848	1,848		New Machines	1,127	189	663	81
	1,299	1,289		Net Improvements	398	51	386	29
	90,701	**88,564**	**1991***	**Annual Capacity**	**44,631**	**7,117**	**25,887**	**1,875**
YEAR END CAPACITY 1987-1991	**81,148**	**79,007**	**1987**	**Year End Capacity**	**39,337**	**6,058**	**22,313**	**1,742**
Year End Capacity is calculated by multiplying Daily Rate by number of Available Days	598	598		New Machines	598	—	469	49
	1,743	1,767		Net Improvements	835	87	761	(52)
	83,489	**81,372**	**1988**	**Year End Capacity**	**40,770**	**6,144**	**23,544**	**1,740**
	1,022	1,022		New Machines	975	486	358	38
	1,662	1,662		Net Improvements	626	68	445	(26)
	86,173	**84,056**	**1989**	**Year End Capacity**	**42,371**	**6,699**	**24,347**	**1,752**
	1,313	1,313		New Machines	983	328	443	—
	1,698	1,689		Net Improvements	534	38	460	25
	89,184	**87,057**	**1990**	**Year End Capacity**	**43,889**	**7,064**	**25,250**	**1,777**
	1,671	1,671		New Machines	864	18	685	151
	693	682		Net Improvements	262	44	344	33
	91,548	**89,410**	**1991***	**Year End Capacity**	**45,015**	**7,126**	**26,278**	**1,962**
YEAR END DAILY RATE 1987-1991	354	355	**1987**	Available Days	356	360	356	358
	229.54	**222.71**		**Daily Rate**	**110.61**	**16.84**	**62.64**	**4.87**
	354	355	**1988**	Available Days	357	360	357	359
	235.73	**229.00**		**Daily Rate**	**114.29**	**17.05**	**65.87**	**4.85**
	354	355	**1989**	Available Days	357	360	357	358
	243.26	**236.53**		**Daily Rate**	**118.78**	**18.60**	**68.12**	**4.89**
	354	355	**1990**	Available Days	357	360	357	358
	251.67	**244.91**		**Daily Rate**	**123.02**	**19.62**	**70.63**	**4.96**
	354	356	**1991***	Available Days	357	360	358	358
	258.28	**251.49**		**Daily Rate**	**126.16**	**19.80**	**73.50**	**5.48**

*Capacity additions presented here for 1991 include only presently known commitments and do not necessarily represent final expansion plans of the industry for that year.

PRINTING, WRITING & RELATED						PACKAGING & INDUSTRIAL CONVERTING				TISSUE
Coated Ground-wood	Coated Free Sheet	Uncoated Free Sheet	Cotton Fiber	Thin Papers	Solid Bleached Bristols	Total	Un-bleached Kraft	Bleached Packaging & Industrial Converting	Specialty Packaging	Special Industrial	Total
4,136	**3,229**	**11,493**	**198**	**290**	**1,079**	**5,492**	**3,295**	**501**	**565**	**1,131**	**5,505**
37	89	50	—	—	—	—	—	—	—	—	83
203	138	354	2	(13)	82	(98)	(152)	27	20	7	37
4,376	**3,456**	**11,897**	**200**	**277**	**1,161**	**5,394**	**3,143**	**527**	**585**	**1,138**	**5,626**
38	170	190	—	—	—	2	—	—	2	—	88
63	105	266	1	2	7	14	2	1	4	7	44
4,478	**3,731**	**12,352**	**201**	**279**	**1,168**	**5,410**	**3,145**	**529**	**590**	**1,146**	**5,757**
164	96	122	—	—	—	40	29	—	11	—	145
17	193	246	—	—	25	(5)	10	(46)	17	15	44
4,659	**4,019**	**12,721**	**201**	**279**	**1,193**	**5,445**	**3,184**	**483**	**618**	**1,160**	**5,946**
4	269	310	—	—	—	120	71	—	49	—	155
41	158	150	—	—	8	(35)	(39)	(4)	—	9	(5)
4,704	**4,446**	**13,180**	**201**	**279**	**1,202**	**5,531**	**3,216**	**479**	**667**	**1,169**	**6,096**
4,146	**3,274**	**11,597**	**199**	**274**	**1,081**	**5,416**	**3,209**	**484**	**583**	**1,140**	**5,550**
—	214	205	—	—	—	—	—	—	—	—	129
250	74	396	2	4	87	(37)	(78)	43	2	(3)	24
4,397	**3,562**	**12,198**	**200**	**278**	**1,168**	**5,380**	**3,131**	**528**	**585**	**1,136**	**5,703**
192	56	73	—	—	—	5	—	—	5	—	125
31	181	255	1	1	1	58	22	1	15	19	55
4,619	**3,800**	**12,527**	**201**	**279**	**1,169**	**5,443**	**3,153**	**529**	**605**	**1,156**	**5,883**
14	181	247	—	—	—	144	88	—	57	—	68
32	183	187	—	—	33	(17)	20	(51)	7	6	53
4,666	**4,164**	**12,961**	**201**	**279**	**1,202**	**5,570**	**3,260**	**479**	**669**	**1,162**	**6,004**
—	228	306	—	—	—	18	18	—	—	—	144
42	156	112	—	—	—	(82)	(87)	—	(4)	9	(44)
4,708	**4,548**	**13,378**	**201**	**279**	**1,202**	**5,506**	**3,191**	**479**	**666**	**1,171**	**6,104**
358	357	356	317	338	359	351	355	354	350	339	354
11.57	**9.17**	**32.58**	**.63**	**.81**	**3.01**	**15.44**	**9.04**	**1.37**	**1.67**	**3.36**	**15.69**
359	359	357	319	339	360	352	356	359	352	339	354
12.26	**9.93**	**34.13**	**.63**	**.82**	**3.25**	**15.29**	**8.81**	**1.47**	**1.67**	**3.35**	**16.09**
359	359	357	319	339	360	352	356	359	352	340	355
12.88	**10.59**	**35.06**	**.63**	**.82**	**3.25**	**15.47**	**8.87**	**1.48**	**1.72**	**3.40**	**16.59**
359	359	357	319	339	360	352	355	358	352	340	355
13.01	**11.60**	**36.26**	**.63**	**.82**	**3.34**	**15.83**	**9.17**	**1.34**	**1.90**	**3.42**	**16.93**
359	359	358	319	339	360	352	355	358	352	340	355
13.13	**12.68**	**37.42**	**.63**	**.82**	**3.34**	**15.66**	**8.98**	**1.34**	**1.89**	**3.45**	**17.21**

Totals not adjusted for rounding differences

Paperboard By Grade

capacity/annual • year end • daily

			PAPER-BOARD	UNBLEACHED KRAFT PAPERBOARD				SOLID BLEACHED PACKAGING PAPERBOARD				
	Practical Maximum Basis											
	Thousands short tons		Total	Total	Liner-board	Folding	Other	Total	Liner-board	Folding	Milk Carton & Food Service	Other
ANNUAL CAPACITY 1987-1991	1987	**Annual Capacity**	**39,106**	19,421	17,949	1,000	473	4,735	148	2,364	2,031	**191**
		New Machines	—	—	—	—	—	—	—	—	—	—
		Net Improvements	1,011	752	664	78	10	(56)	18	(83)	21	(12)
Annual Capacity includes changes in capacity only for the portion of the year in which they are actually effective	1988	**Annual Capacity**	**40,116**	**20,174**	**18,613**	**1,078**	**483**	**4,679**	**167**	**2,282**	**2,051**	**179**
		New Machines	18	—	—	—	—	—	—	—	—	—
		Net Improvements	995	501	471	26	4	36	1	10	27	(2)
	1989	**Annual Capacity**	**41,128**	**20,675**	**19,084**	**1,104**	**487**	**4,715**	**168**	**2,292**	**2,078**	**177**
		New Machines	136	86	86	—	—	—	—	—	—	—
		Net Improvements	1,057	678	626	49	4	100	14	58	29	(1)
	1990	**Annual Capacity**	**42,321**	**21,439**	**19,796**	**1,153**	**490**	**4,815**	**181**	**2,350**	**2,107**	**176**
		New Machines	721	700	557	143	—	—	—	—	—	—
		Net Improvements	891	458	430	26	1	170	5	72	93	—
	1991*	**Annual Capacity**	**43,933**	**22,597**	**20,783**	**1,322**	**491**	**4,985**	**186**	**2,422**	**2,201**	**176**
YEAR END CAPACITY 1987-1991	1987	**Year End Capacity**	**39,670**	19,921	18,430	1,015	475	4,705	157	2,337	2,012	**199**
		New Machines	—	—	—	—	—	—	—	—	—	—
		Net Improvements	931	489	412	69	9	(52)	11	(84)	43	(22)
Year End Capacity is calculated by multiplying Daily Rate by number of Available Days	1988	**Year End Capacity**	**40,601**	**20,410**	**18,842**	**1,084**	**484**	**4,652**	**168**	**2,252**	**2,055**	**177**
		New Machines	50	—	—	—	—	—	—	—	—	—
		Net Improvements	1,036	668	604	60	4	84	—	52	32	—
	1989	**Year End Capacity**	**41,685**	**21,078**	**19,445**	**1,144**	**488**	**4,736**	**168**	**2,304**	**2,087**	**177**
		New Machines	330	302	302	—	—	—	—	—	—	—
		Net Improvements	1,154	595	566	26	4	202	18	101	83	(1)
	1990	**Year End Capacity**	**43,169**	**21,974**	**20,313**	**1,171**	**491**	**4,938**	**186**	**2,406**	**2,170**	**176**
		New Machines	807	789	593	195	—	—	—	—	—	—
		Net Improvements	420	193	166	26	—	75	—	29	46	—
	1991*	**Year End Capacity**	**44,395**	**22,956**	**21,072**	**1,392**	**491**	**5,012**	**186**	**2,434**	**2,216**	**176**
YEAR END DAILY RATE 1987-1991	1987	Available Days	354	357	357	353	358	361	358	362	361	363
		Daily Rate	**112.10**	**55.87**	**51.67**	**2.88**	**1.33**	**13.03**	**.44**	**6.46**	**5.58**	**.55**
	1988	Available Days	354	356	357	353	358	361	359	361	360	363
		Daily Rate	**114.71**	**57.27**	**52.85**	**3.07**	**1.35**	**12.89**	**.47**	**6.24**	**5.70**	**.49**
	1989	Available Days	354	356	357	353	358	361	359	361	360	363
		Daily Rate	**117.75**	**59.14**	**54.54**	**3.24**	**1.36**	**13.13**	**.47**	**6.38**	**5.79**	**.49**
	1990	Available Days	354	356	357	353	358	361	359	361	360	363
		Daily Rate	**121.90**	**61.66**	**56.97**	**3.32**	**1.37**	**13.68**	**.52**	**6.66**	**6.02**	**.49**
	1991*	Available Days	354	356	357	353	358	361	359	361	360	363
		Daily Rate	**125.32**	**64.40**	**59.08**	**3.94**	**1.37**	**13.89**	**.52**	**6.74**	**6.02**	**.49**

**Capacity additions presented here for 1991 include only presently known commitments and do not necessarily represent final expansion plans of the industry for that year.*

Construction Paper & Board By Grade

SEMI-CHEMICAL PAPERBOARD	RECYCLED PAPERBOARD								CONSTRUCTION PAPER & BOARD & WET MACHINE BOARD			
Total	Total	Liner-board	Corru-gating Medium	Container Chip & Filler	Folding	Set-up	Gypsum Wall Board Facing	Other	Total	Construc-tion Paper	Wet Machine Board	Insu-lating Board
5,682	**9,267**	**515**	**1,685**	**40**	**2,661**	**275**	**1,386**	**2,706**	**2,155**	**822**	**153**	**1,179**
—	—	—	—	—	—	—	—	—	—	—	—	—
114	201	48	165	5	(89)	(8)	1	79	(35)	(3)	(26)	(6)
5,796	**9,468**	**563**	**1,850**	**44**	**2,571**	**267**	**1,387**	**2,785**	**2,120**	**819**	**127**	**1,174**
—	18	—	5	—	1	—	—	12	—	—	—	—
191	267	31	183	—	(10)	2	10	51	(2)	—	(3)	—
5,987	**9,752**	**594**	**2,038**	**44**	**2,562**	**268**	**1,397**	**2,848**	**2,117**	**819**	**124**	**1,174**
—	50	—	30	—	7	—	—	13	—	—	—	—
173	105	21	42	—	19	2	7	15	9	9	—	—
6,160	**9,907**	**615**	**2,110**	**44**	**2,587**	**270**	**1,404**	**2,876**	**2,126**	**828**	**124**	**1,174**
—	21	—	—	—	5	—	—	16	—	—	—	—
208	55	23	13	—	5	—	1	13	11	11	—	—
6,369	**9,983**	**638**	**2,123**	**44**	**2,597**	**271**	**1,404**	**2,905**	**2,137**	**839**	**124**	**1,174**
5,678	**9,367**	**546**	**1,764**	**44**	**2,643**	**278**	**1,377**	**2,716**	**2,141**	**820**	**154**	**1,167**
—	—	—	—	—	—	—	—	—	—	—	—	—
248	246	28	197	—	(88)	(11)	11	108	(24)	(1)	(30)	7
5,926	**9,614**	**574**	**1,961**	**44**	**2,555**	**267**	**1,388**	**2,824**	**2,117**	**819**	**124**	**1,174**
—	47	—	35	—	3	—	—	9	—	—	—	—
102	183	30	99	—	25	3	10	15	—	—	—	—
6,028	**9,843**	**605**	**2,096**	**44**	**2,582**	**270**	**1,398**	**2,848**	**2,117**	**819**	**124**	**1,174**
—	28	—	—	—	7	—	—	22	—	—	—	—
287	71	19	26	—	5	—	7	14	9	9	—	—
6,314	**9,942**	**624**	**2,121**	**44**	**2,594**	**270**	**1,404**	**2,884**	**2,127**	**828**	**124**	**1,174**
—	18	—	—	—	4	—	—	14	—	—	—	—
105	48	27	2	—	5	1	—	13	11	11	—	—
6,419	**10,008**	**651**	**2,123**	**44**	**2,603**	**271**	**1,404**	**2,911**	**2,138**	**840**	**125**	**1,174**
356	344	351	352	343	344	337	337	342	313	332	295	304
15.96	**27.24**	**1.56**	**5.01**	**.13**	**7.68**	**.82**	**4.08**	**7.95**	**6.83**	**2.47**	**.52**	**3.84**
356	345	354	352	343	344	337	337	342	315	331	294	306
16.64	**27.91**	**1.62**	**5.57**	**.13**	**7.42**	**.79**	**4.12**	**8.25**	**6.73**	**2.47**	**.42**	**3.84**
356	345	354	352	343	344	337	337	342	315	331	294	306
16.93	**28.56**	**1.71**	**5.95**	**.13**	**7.50**	**.80**	**4.15**	**8.32**	**6.73**	**2.47**	**.42**	**3.84**
356	345	354	352	343	345	337	337	342	315	331	294	306
17.72	**28.84**	**1.76**	**6.02**	**.13**	**7.53**	**.80**	**4.17**	**8.42**	**6.76**	**2.50**	**.42**	**3.84**
356	345	355	352	343	345	337	337	342	315	332	294	306
18.01	**29.02**	**1.84**	**6.03**	**.13**	**7.56**	**.80**	**4.17**	**8.50**	**6.79**	**2.50**	**.42**	**3.84**

Totals not adjusted for rounding differences.

Wood Pulp By Grade

capacity/annual • year end • daily — for paper & paperboard

		Practical Maximum Basis / *Thousands short tons*	ALL GRADES WOOD PULP	WOOD PULP (exc. pulp for Construction Paper & Board)	DISSOLVING	CHEMICAL PAPER GRADES					
							SULFITE			SULFATE	
											Bleach Semible
			Total	Total	Total	Total	Total	Bleached	Unbleached	Total	Hardwood
ANNUAL CAPACITY 1987-1991	1987	**Annual Capacity**	**62,076**	**61,172**	1,389	48,825	1,646	1,460	186	47,179	**11,823**
		New Machines	229	229	—	119	—	—	—	119	60
		Net Improvements	1,273	1,275	13	1,138	(57)	(52)	(5)	1,194	386
Annual Capacity includes changes in capacity only for the portion of the year in which they are actually effective	1988	**Annual Capacity**	**63,578**	**62,676**	1,401	50,082	1,589	1,407	182	48,492	**12,269**
		New Machines	469	469	—	276	—	—	—	276	209
		Net Improvements	715	715	—	577	3	3	—	574	201
	1989	**Annual Capacity**	**64,762**	**63,860**	1,402	50,934	1,592	1,410	182	49,342	**12,679**
		New Machines	1,119	1,119	—	683	—	—	—	683	327
		Net Improvements	708	678	—	589	1	1	—	588	171
	1990	**Annual Capacity**	**66,589**	**65,657**	1,402	52,206	1,593	1,411	182	50,613	**13,177**
		New Machines	1,189	1,189	—	1,016	—	—	—	1,016	399
		Net Improvements	943	908	—	746	(2)	(2)	—	748	53
	1991*	**Annual Capacity**	**68,721**	**67,754**	1,402	53,968	1,591	1,409	182	52,377	**13,629**
YEAR END CAPACITY 1987-1991	1987	**Year End Capacity**	**62,894**	**61,992**	1,393	49,530	1,589	1,407	182	47,941	**12,063**
		New Machines	335	335	—	307	—	—	—	307	235
		Net Improvements	988	988	9	734	—	—	—	734	233
Year End Capacity is calculated multiplying Daily Rate by number of Available Days	1988	**Year End Capacity**	**64,217**	**63,315**	1,402	50,571	1,589	1,407	182	48,982	**12,531**
		New Machines	684	684	—	143	—	—	—	143	71
		Net Improvements	483	483	—	528	11	11	—	517	168
	1989	**Year End Capacity**	**65,384**	**64,482**	1,402	51,242	1,600	1,419	182	49,642	**12,711**
		New Machines	1,372	1,372	—	1,131	—	—	—	1,131	461
		Net Improvements	952	919	—	733	(9)	(9)	—	742	180
	1990	**Year End Capacity**	**67,708**	**66,773**	1,402	53,106	1,591	1,409	182	51,515	**12,411**
		New Machines	1,071	1,071	—	1,055	—	—	—	1,055	548
		Net Improvements	645	610	—	457	—	—	—	458	38
	1991*	**Year End Capacity**	**69,424**	**68,454**	1,402	54,618	1,591	1,409	182	53,027	**13,997**
YEAR END DAILY RATE 1987-1991	1987	Available Days	357	358	353	358	358	357	362	358	358
		Daily Rate	**176.07**	**173.19**	**3.95**	**138.41**	**4.44**	**3.94**	**.50**	**133.96**	**33.67**
	1988	Available Days	357	358	353	358	358	357	362	358	358
		Daily Rate	**179.76**	**176.88**	**3.98**	**141.31**	**4.44**	**3.94**	**.50**	**136.86**	**34.96**
	1989	Available Days	357	358	353	358	357	357	362	358	358
		Daily Rate	**183.04**	**180.16**	**3.98**	**143.19**	**4.48**	**3.98**	**.50**	**138.72**	**35.64**
	1990	Available Days	357	358	353	358	357	357	362	358	358
		Daily Rate	**189.50**	**186.53**	**3.98**	**148.37**	**4.45**	**3.99**	**.50**	**143.92**	**37.42**
	1991*	Available Days	357	358	353	358	357	357	362	358	359
		Daily Rate	**194.29**	**191.22**	**3.98**	**152.58**	**4.45**	**3.99**	**.50**	**148.13**	**39.04**

**Capacity additions presented here for 1991 include only presently known commitments and do not necessarily represent final expansion plans of the industry for that year.*

for construction paper & board

AND SODA		SEMICHEMICAL			MECHANICAL				SCREEN-INGS	WOOD PULP FOR CONSTRUCTION PAPER & BOARD		
ed & ached												
Softwood	Unbleached	Total	Bleached	Unbleached	Total	Stone Ground-wood	Refiner	Thermo-mechan-ical	Total	Total	Stone Ground-wood & Refiner	Defib-rated/ Exploded†
13,623	**21,733**	**4,697**	**408**	**4,289**	**6,256**	**2,942**	**348**	**2,966**	**6**	**904**	**275**	**629**
59	—	—	—	—	110	68	—	43	—	—	—	—
257	552	77	(2)	79	48	1	(13)	60	(1)	(2)	4	(5)
13,939	**22,285**	**4,774**	**406**	**4,368**	**6,415**	**3,011**	**335**	**3,068**	**4**	**902**	**279**	**623**
67	—	—	—	—	193	116	—	77	—	—	—	—
97	276	101	—	101	37	(23)	(1)	61	—	—	—	—
14,102	**22,561**	**4,875**	**406**	**4,469**	**6,644**	**3,104**	**334**	**3,207**	**4**	**902**	**279**	**623**
282	80	—	—	—	435	147	—	288	—	—	—	—
31	386	121	—	121	(32)	(8)	—	(24)	—	30	—	30
14,415	**23,022**	**4,996**	**406**	**4,590**	**7,048**	**3,243**	**334**	**3,471**	**4**	**932**	**279**	**654**
235	382	—	—	—	173	—	—	173	—	—	—	—
250	446	76	—	76	87	27	36	24	—	35	—	35
14,899	**23,849**	**5,072**	**406**	**4,666**	**7,308**	**3,269**	**370**	**3,669**	**4**	**967**	**279**	**688**
13,843	**22,034**	**4,712**	**406**	**4,306**	**6,353**	**2,972**	**348**	**3,033**	**4**	**902**	**279**	**623**
71	—	—	—	—	28	28	—	—	—	—	—	—
100	402	147	—	147	98	21	(14)	92	—	—	—	—
14,015	**22,436**	**4,859**	**406**	**4,453**	**6,479**	**3,020**	**334**	**3,125**	**4**	**902**	**279**	**623**
71	—	—	—	—	542	256	—	286	—	—	—	—
81	268	33	—	33	(78)	(56)	—	(22)	—	—	—	—
14,167	**22,704**	**4,891**	**406**	**4,485**	**6,943**	**3,220**	**334**	**3,389**	**4**	**902**	**279**	**623**
383	287	—	—	—	241	—	—	241	—	—	—	—
2	561	152	—	152	34	30	—	4	—	33	—	33
14,552	**23,552**	**5,043**	**406**	**4,637**	**7,218**	**3,251**	**334**	**3,634**	**4**	**935**	**279**	**656**
276	231	—	—	—	16	—	—	16	—	—	—	—
280	139	32	—	32	120	25	54	41	—	35	—	35
15,108	**23,922**	**5,075**	**406**	**4,669**	**7,354**	**3,276**	**388**	**3,691**	**4**	**970**	**279**	**691**
358	357	356	356	356	361	361	361	361	364	313	339	303
38.63	**61.66**	**13.22**	**1.14**	**12.08**	**17.60**	**8.24**	**.96**	**8.40**	**.01**	**2.88**	**.82**	**2.06**
358	357	356	356	356	361	361	361	361	364	313	339	303
39.11	**62.79**	**13.64**	**1.14**	**12.50**	**17.95**	**8.37**	**.92**	**8.65**	**.01**	**2.88**	**.82**	**2.06**
358	357	356	356	356	361	361	361	361	364	313	339	303
39.53	**63.55**	**13.73**	**1.14**	**12.59**	**19.25**	**8.93**	**.92**	**9.39**	**.01**	**2.88**	**.82**	**2.06**
358	357	356	356	356	361	361	361	361	364	314	339	305
40.61	**65.90**	**14.15**	**1.14**	**13.01**	**20.02**	**9.02**	**.92**	**10.08**	**.01**	**2.97**	**.82**	**2.15**
358	357	356	356	356	361	361	361	360	364	316	339	307
42.16	**66.94**	**14.24**	**1.14**	**13.11**	**20.40**	**9.09**	**1.07**	**10.24**	**.01**	**3.07**	**.82**	**2.25**

†Excludes the defibrated/exploded pulp cpacity of mills that produce hard pressed board. *Totals not adjusted for rounding differences.*

Annual Capacity/Regional Distribution

paper & paperboard

TOTAL U.S. CAPACITY		GRADES	NEW ENGLAND		MID-ATLANTIC		E. NO. CENTRAL	
1987	**1991**	*Practical Maximum Basis/Thousands short tons*	**1987**	**1991**	**1987**	**1991**	**1987**	**1991**
80,341	**90,701**	**TOTAL ALL GRADES PAPER & PAPERBOARD**	**6,117**	**6,790**	**5,795**	**6,048**	**12,653**	**13,901**
78,186	**88,564**	**TOTAL PAPER & PAPERBOARD**	**6,060**	**6,734**	**5,378**	**5,653**	**12,408**	**13,659**
39,080	**44,631**	**TOTAL PAPER**	**5,175**	**5,704**	**3,965**	**4,103**	**7,610**	**8,505**
6,006	7,117	NEWSPRINT	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
22,077	25,887	PRINTING, WRITING & RELATED	3,812	4,303	2,400	2,491	5,151	5,742
1,653	1,875	Uncoated Groundwood	646	632	N.A.	N.A.	319	278
4,136	4,704	Coated Groundwood	1,235	1,194	270	274	1,250	1,358
3,229	4,446	Coated Free Sheet	562	706	186	261	1,102	1,510
11,981	13,660	Uncoated Free Sheet[1]	1,358	1,504	1,766	1,780	2,356	2,470
1,079	1,202	Solid Bleached Bristols	10	11	14	14	124	126
5,492	5,531	PACKAGING & INDUSTRIAL CONVERTING	498	492	315	314	888	1,009
5,505	6,096	TISSUE	522	535	1,034	1,074	1,412	1,580
39,106	**43,933**	**TOTAL PAPERBOARD**	**886**	**1,030**	**1,413**	**1,550**	**4,797**	**5,153**
19,421	22,597	UNBLEACHED KRAFT	—	—	—	—	—	—
17,949	20,783	of which Kraft Linerboard	—	—	—	—	—	—
4,735	4,985	SOLID BLEACHED	N.A.	N.A.	—	—	N.A.	N.A.
5,682	6,369	SEMICHEMICAL	N.A.	N.A.	—	—	1,818	2,043
9,267	9,983	RECYCLED	764	906	1,413	1,550	2,978	3,110
2,155	**2,137**	**TOTAL CONSTRUCTION PAPER & BOARD**	**57**	**56**	**417**	**395**	**245**	**242**

wood pulp

62,076	**68,721**	**TOTAL ALL GRADES WOOD PULP**	**3,464**	**3,682**	**1,429**	**1,448**	**4,014**	**4,214**
61,172	**67,754**	**TOTAL WOOD PULP (exc. pulp for Construction Paper & Board)**	**3,381**	**3,596**	**1,411**	**1,430**	**3,908**	**4,108**
1,389	1,402	DISSOLVING	—	—	—	—	—	—
1,646	1,591	SULFITE PAPER GRADES	N.A.	N.A.	N.A.	N.A.	400	349
47,179	52,377	SULFATE & SODA PAPER GRADES	2,093	2,280	499	512	1,641	1,796
13,623	14,899	Bleached & Semibleached Softwood	632	662	144	155	365	449
11,823	13,629	Bleached & Semibleached Hardwood	1,396	1,557	355	357	1,043	1,113
21,739	23,853	Unbleached[2]	N.A.	N.A.	—	—	N.A.	N.A.
4,679	5,072	SEMICHEMICAL	N.A.	N.A.	466	467	1,370	1,468
6,256	7,308	MECHANICAL	1,014	1,046	191	194	497	495
904	**967**	**WOOD PULP FOR CONSTRUCTION PAPER & BOARD[3]**	**83**	**86**	**18**	**18**	**106**	**106**

(1) Includes cotton fiber and thin papers.
(2) Includes screenings.
(3) Excludes defibrated/exploded pulp capacity of mills that produce hard pressed board.
N.A. — Not Available

W. NO. CENTRAL		SO. ATLANTIC		E. SO. CENTRAL		W. SO. CENTRAL		MOUNTAIN & PACIFIC*		LOCATION NOT DETERMINED	
1987	1991	1987	1991	1987	1991	1987	1991	1987	1991	1987	1991
1,768	**2,421**	**19,663**	**21,895**	**10,784**	**12,496**	**11,887**	**13,896**	**11,673**	**12,904**	—	**351**
1,596	**2,228**	**19,187**	**21,420**	**10,365**	**12,093**	**11,603**	**13,608**	**11,588**	**12,819**	—	**351**
1,092	**1,722**	**6,333**	**7,319**	**4,404**	**5,414**	**5,018**	**5,712**	**5,484**	**6,071**	—	**351**
—	—	1,059	1,325	1,147	1,599	1,193	1,243	1,887	2,177	—	—
1,073	1,697	3,155	3,820	2,440	2,734	2,155	2,721	1,861	2,003	—	351
N.A.	N.A.	N.A.	N.A.	122	101	N.A.	N.A.	223	303	—	—
N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	82	65	—	—
N.A.	N.A.	N.A.	N.A.	364	638	N.A.	N.A.	166	192	—	—
240	326	1,926	2,463	1,703	1,708	1,275	1,648	1,356	1,411	—	351
—	—	433	515	N.A.	N.A.	360	409	65	58	—	—
N.A.	N.A.	1,575	1,399	175	169	1,214	1,235	807	889	—	—
—	—	543	776	641	643	455	513	898	975	—	—
504	**506**	**12,855**	**14,102**	**5,962**	**6,948**	**6,586**	**7,896**	**6,103**	**6,748**	—	—
—	—	8,419	8,346	3,827	4,594	3,938	4,981	3,238	3,675	—	—
—	—	7,900	8,824	3,378	3,992	3,469	4,327	3,203	3,639	—	—
—	—	1,965	2,006	800	815	1,431	1,575	521	574	—	—
N.A.	N.A.	1,168	1,298	919	1,066	810	917	785	863	—	—
429	433	1,302	1,452	416	474	407	423	1,559	1,636	—	—
172	**193**	**476**	**474**	**419**	**403**	**284**	**288**	**85**	**85**	—	—
714	**1,111**	**19,549**	**21,451**	**11,574**	**13,205**	**10,837**	**12,143**	**10,495**	**11,182**	—	**286**
663	**995**	**19,290**	**21,191**	**11,340**	**12,976**	**10,746**	**12,053**	**10,433**	**11,120**	—	**286**
—	—	521	522	N.A.	N.A.	—	—	653	671	—	—
—	—	—	—	—	—	—	—	806	803	—	—
334	443	17,039	18,810	9,482	10,515	9,074	10,250	7,022	7,491	—	286
N.A.	N.A.	4,792	5,223	2,420	2,640	2,246	2,426	2,941	3,104	—	143
N.A.	N.A.	3,357	3,865	3,237	3,691	2,031	2,394	164	182	—	143
N.A.	N.A.	8,890	9,722	3,826	4,184	4,797	5,430	3,917	4,205	—	—
N.A.	N.A.	831	916	671	829	645	728	579	527	—	—
282	502	899	944	973	1,422	1,026	1,075	1,373	1,628	—	—
51	**116**	**259**	**260**	**234**	**229**	**91**	**90**	**62**	**62**	—	—

Totals not adjusted for rounding differences

*Includes Alaska

World Capacity

wood pulp (Except Defibrated/Exploded & Screenings)

Thousands of METRIC tons

	TOTALS			MECHANICAL		SEMICHEMICAL		CHEMICAL PAPER		
	1987	1991	Percent Increase	1987	1991	1987	1991	1987	1991	of which 1987
WORLD TOTAL	**162,467**	**180,695**	**11.2**	38,636	45,060	9,515	10,279	108,395	119,105	31,450
DEVELOPED MARKET ECONOMIES	**130,844**	**145,762**	**11.4**	32,514	38,263	7,547	8,119	87,509	95,803	25,982
NORTH AMERICA	**79,755**	**88,592**	**11.1**	16,120	19,230	4,726	5,148	57,404	62,661	15,708
U.S.	**55,495**	**61,466**	**10.8**	5,675	6,630	4,261	4,601	44,299	48,963	8,373
Canada	**24,260**	**27,126**	**11.8**	10,445	12,600	465	547	13,105	13,698	7,335
JAPAN	**12,567**	**13,927**	**10.8**	2,697	3,213	1,173	1,095	8,372	9,294	873
WESTERN EUROPE	**34,184**	**38,613**	**13.0**	12,090	14,173	1,273	1,407	19,803	21,766	8,676
E.E.C.	**6,853**	**8,001**	**16.8**	3,433	4,086	425	454	2,843	3,240	1,036
Nordic countries	**21,545**	**24,345**	**13.0**	7,730	9,040	780	885	12,470	13,675	5,325
Rest of Western Europe	**5,786**	**6,267**	**8.3**	927	1,047	68	68	4,490	4,851	2,315
OCEANIA	**2,473**	**2,760**	**11.6**	1,237	1,277	211	305	1,014	1,166	335
OTHERS	**1,865**	**1,870**	**0.3**	370	370	164	164	916	916	390
DEVELOPING MARKET ECONOMIES	**10,224**	**12,976**	**26.9**	1,854	2,349	677	868	7,325	9,391	2,847
AFRICA	**884**	**1,033**	**16.9**	131	148	25	25	728	860	437
LATIN AMERICA	**6,784**	**8,877**	**30.9**	958	1,406	365	496	5,363	6,877	2,193
of which: Brazil	**4,289**	**5,508**	**28.4**	518	555	129	234	3,558	4,635	1,491
Mexico	**652**	**898**	**37.7**	145	295	—	—	507	603	—
ASIA	**2,556**	**3,066**	**20.0**	765	795	287	347	1,234	1,654	217
CENTRALLY PLANNED ECONOMIES	**21,399**	**21,957**	**2.6**	4,268	4,448	1,291	1,292	13,561	13,911	2,621
of which: USSR	**13,750**	**13,750**	—	2,500	2,500	850	850	8,700	8,700	2,000

Totals not adjusted for rounding differences.

**No data available for 1991*

Structure of U.S. Paper, Paperboard, Wood Pulp

capacity in integrated & nonintegrated paper & paperboard mills

Thousand short tons

GRADES	ANNUAL CAPACITY		
	INTEGRATED TO WOOD PULP	NOT INTEGRATED TO WOOD PULP	TOTAL
TOTAL	**61,106**	**19,235**	**80,341**
PAPER	**29,682**	**9,398**	**39,080**
Newsprint	5,493	513	6,006
Uncoated Groundwood	1,318	335	1,653
Coated Groundwood	4,008	128	4,136
Coated Free Sheet	2,436	793	3,229
Uncoated Free Sheet*	9,058	2,633	11,691
Thin Papers	74	216	290
Solid Bleached Bristols	981	98	1,079
Pkg. & Ind. Conv.	4,048	1,444	5,492
Tissue	2,266	3,239	5,505
PAPERBOARD	**30,099**	**9,007**	**39,106**
Unbleached Kraft	19,421	--	19,421
Solid Bleached	4,733	2	4,735
Semichemical	5,576 -	106	5,682
Recycled	368	8,899	9,267
CONSTRUCTION PAPER & BOARD	**1,325**	**830**	**2,155**

Integrated mills include all mills with whether or not this capacity provides active on-site wood pulp capacity, a significant portion of total furnish.

Capacities measured on a practical maximum basis.

**Includes cotton fiber*

Totals not adjusted for rounding differences.

paper & paperboard (Except Insulating & Hard Pressed Board)

Thousands of METRIC tons

GRADES	DISSOLVING		TOTALS			NEWSPRINT		PRINTING & WRITING		WRAPPING		ALL OTHERS	
market 1990*	1987	1991	1987	1991	Percent Increase	1987	1991	1987	1991	1987	1991	1987	1991
33,483	5,921	6,251	**233,096**	**263,565**	**13.1**	32,825	39,022	63,444	74,983	109,942	120,365	26,885	29,195
27,633	3,274	3,577	**178,485**	**202,317**	**13.4**	27,191	32,479	51,341	61,036	79,818	87,142	20,135	21,660
16,474	1,505	1,553	**88,340**	**100,788**	**14.1**	15,374	18,052	22,526	27,130	41,510	46,073	8,930	9,533
9,047	1,260	1,272	**71,816**	**81,219**	**13.1**	5,449	6,457	19,765	23,232	38,177	42,539	8,425	8,991
7,427	245	281	**16,524**	**19,569**	**18.4**	9,925	11,595	2,761	3,898	3,333	3,534	505	542
825	325	325	**25,286**	**28,189**	**11.5**	2,868	3,651	6,899	7,850	11,104	11,927	4,415	4,761
9,564	1,018	1,267	**60,266**	**68,265**	**13.3**	7,802	9,379	21,139	25,212	24,969	26,808	6,356	6,866
1,743	152	221	**31,656**	**36,223**	**14.4**	2,301	3,023	11,884	14,214	13,575	14,734	3,896	4,252
5,320	565	745	**18,663**	**21,710**	**16.3**	4,580	5,395	6,175	7,640	6,600	7,215	1,308	1,460
2,501	301	301	**9,947**	**10,332**	**3.9**	921	961	3,080	3,358	4,794	4,859	1,152	1,154
380	11	12	**2,565**	**3,004**	**17.1**	705	955	404	465	1,199	1,269	257	315
390	415	420	**2,028**	**2,071**	**2.1**	442	442	373	379	1,036	1,065	177	185
3,234	368	368	**23,379**	**27,547**	**17.8**	2,626	3,380	5,863	7,000	12,369	14,352	2,521	2,815
437	—	—	**1,093**	**1,257**	**15.0**	126	141	363	450	539	601	65	65
2,352	98	98	**12,705**	**14,463**	**13.8**	1,199	1,493	2,898	3,144	6,741	7,641	1,867	2,185
1,544	84	84	**3,337**	**3,824**	**14.5**	420	480	606	648	1,810	2,180	501	516
—	—	—	**5,374**	**6,025**	**12.1**	244	254	1,491	1,524	2,987	3,386	652	861
445	270	270	**9,581**	**11,827**	**23.4**	1,301	1,746	2,602	3,406	5,089	6,110	589	565
2,616	2,279	2,306	**31,232**	**33,701**	**7.9**	3,008	3,163	6,240	6,947	17,755	18,871	4,229	4,720
2,000	1,700	1,700	**14,000**	**14,000**	—	1,950	1,950	1,700	1,700	9,465	9,465	885	885

Source: Food and Agriculture Organization of the United Nations, U.S. capacity-American Paper Institute

Industry — 1987

mill size
paper, paperboard
& wood pulp

ANNUAL CAPACITY RANGE Thousands short tons	PAPER & PAPERBOARD		WOOD PULP	
	NUMBER OF MILLS	SHARE OF TOTAL CAPACITY	NUMBER OF MILLS	SHARE OF TOTAL CAPACITY
TOTAL	**548**	**100%**	**217**	**100%**
0-25	137	2.2	13	0.3
26-50	89	4.1	16	1.0
51-75	69	5.4	16	1.6
76-100	38	4.2	12	1.7
101-125	27	3.8	13	2.4
126-150	26	4.4	8	1.7
151-175	8	1.6	10	2.6
176-200	21	4.9	9	2.8
201-250	31	8.7	20	7.0
251-300	20	6.9	15	6.5
301-350	12	5.0	9	4.7
351-400	8	3.7	14	8.5
401-450	16	8.6	10	6.9
451-500	11	6.5	14	10.7
over 500	35	30.0	38	41.6

machines in operations 1987

size of machines — by principal grade produced

Machine Annual Capacity (Thousands short tons)	Paper: Newsprint Number of Machines	Newsprint Share of Total Capacity	Printing & Writing Number of Machines	Printing & Writing Share of Total Capacity	Packaging & Ind. Conv. Number of Machines	Packaging & Ind. Conv. Share of Total Capacity	Tissue Number of Machines	Tissue Share of Total Capacity
Total	41	100%	421	100%	183	100%	209	100%
0-5	—	—	38	1	33	2	19	1
6-10	—	—	34	1	42	6	28	4
11-15	—	—	23	1	26	6	25	6
16-20	—	—	28	2	18	6	23	7
21-30	—	—	59	7	22	9	34	15
31-40	2	1	43	7	8	5	32	20
41-50	1	1	38	8	3	2	26	21
51-75	5	6	58	16	6	6	17	18
76-100	2	3	36	14	5	8	5	8
101-125	5	10	18	9	7	13	—	—
126-150	12	29	14	8	5	12	—	—
151-200	6	18	24	19	7	20	—	—
201-250	7	28	7	6	—	—	—	—
251-300	1	4	1	1	1	5	—	—

All data based on machines in place January 1987

age of machines — by principal grade produced

Year Machine Installed Or Rebuilt*	Paper: Newsprint Number of Machines	Newsprint Share of Total Capacity	Printing & Writing Number of Machines	Printing & Writing Share of Total Capacity	Packaging & Ind. Conv. Number of Machines	Packaging & Ind. Conv. Share of Total Capacity	Tissue Number of Machines	Tissue Share of Total Capacity
Total	41		421		183		209	
No Data Available	1		64		21		44	
Total Sample	40	100%	357	100%	162	100%	165	100%
1986	3	6	18	9	3	4	2	2
1985	2	5	21	5	9	5	9	7
1984	7	14	16	7	3	4	5	4
1983	4	8	15	5	12	7	5	4
1982	1	2	22	7	9	11	1	—
1981	4	13	17	6	8	11	7	6
1980	1	3	18	6	9	8	6	4
1979	5	17	9	2	2	1	5	5
1978	—	—	10	2	3	2	6	5
1977	—	—	13	4	4	5	5	4
1976	1	3	13	3	5	4	12	4
1971-1975	4	10	40	12	21	9	14	10
1966-1970	4	11	50	14	28	13	34	22
1961-1965	—	—	46	10	16	4	28	16
1956-1960	2	4	18	3	6	1	8	3
1951-1955	2	4	13	3	8	4	1	—
Prior to 1951	—	—	18	2	16	7	17	4

All data based on machines in place January 1987

age of machines — by geographic region

Year Machine Installed Or Rebuilt*	Total U.S. Number of Machines	Total U.S. Share of Total Capacity	New England Number of Machines	New England Share of Total Capacity	Mid-Atlantic Number of Machines	Mid-Atlantic Share of Total Capacity	E. No. Central Number of Machines	E. No. Central Share of Total Capacity
Total	1,239		208		204		318	
No Data Available	201		41		56		40	
Total Sample	1,038	100%	167	100%	148	100%	278	100%
1986	37	7	4	6	2	1	11	6
1985	56	5	8	3	6	5	22	8
1984	37	5	3	2	3	2	10	5
1983	45	3	8	1	9	5	11	4
1982	50	7	17	13	5	2	8	6
1981	49	6	3	4	6	5	14	6
1980	48	6	7	5	4	4	14	6
1979	33	5	4	2	4	3	6	4
1978	34	4	5	4	4	1	6	4
1977	32	3	9	7	2	1	5	3
1976	38	3	6	5	3	2	12	2
1971-1975	138	14	18	15	22	22	40	16
1966-1970	153	14	28	15	28	20	40	13
1961-1965	113	8	20	9	21	13	24	5
1956-1960	53	3	5	1	13	8	15	3
1951-1955	35	3	7	6	3	2	9	2
Prior to 1951	67	4	15	2	13	4	31	1

All data based on machines in place January 1987

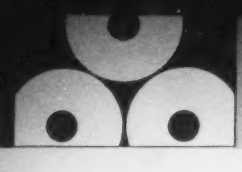
Machine Annual Capacity Thousands short tons	Paperboard: Unbleached Kraft		Solid Bleached		Semichemical		Recycled		Construction Grades: Construction	
	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity
Total	66	100%	27	100%	38	100%	187	100%	67	100 %
0-5	—	—	—	—	—	—	5	—	10	1
6-10	—	—	—	—	—	—	1	—	9	4
11-15	—	—	—	—	—	—	10	1	6	3
16-20	—	—	—	—	—	—	13	3	6	5
21-30	—	—	—	—	—	—	31	8	12	15
31-40	—	—	—	—	1	1	29	11	5	8
41-50	—	—	1	1	—	—	26	13	5	10
51-75	2	1	2	2	5	6	43	27	5	15
76-100	1	—	—	—	2	3	15	13	7	28
101-125	2	2	—	—	10	20	6	7	1	5
126-150	2	2	1	3	8	20	3	4	1	6
151-200	9	9	15	51	5	16	2	4	—	—
201-250	13	15	4	16	3	12	2	5	—	—
251-300	7	11	2	10	2	10	1	3	—	—
301-400	21	38	1	7	2	12	—	—	—	—
over 400	9	22	1	10	—	—	—	—	—	—

Year Machine Installed Or Rebuilt*	Paperboard: Unbleached Kraft		Solid Bleached		Semichemical		Recycled		Construction Grades: Construction	
	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity
Total	66		27		38		187		67	
No Data Available	—		—		—		41		30	
Total Sample	66	100%	27	100%	38	100%	146	100%	37	100 %
1986	3	5	4	26	1	2	3	5	—	—
1985	3	5	—	—	2	5	8	7	—	—
1984	1	1	—	—	1	5	4	3	—	—
1983	1	2	—	—	—	—	7	4	1	—
1982	7	11	1	3	3	9	6	6	—	—
1981	3	5	—	—	1	6	9	6	—	—
1980	7	10	1	3	1	2	6	4	—	—
1979	5	6	3	11	1	1	3	3	—	—
1978	4	7	1	4	5	16	3	1	1	1
1977	1	2	1	4	1	3	5	6	2	8
1976	1	2	2	7	1	—	3	2	1	2
1971-1975	6	10	4	15	12	30	25	20	12	44
1966-1970	8	15	3	12	6	14	16	9	4	6
1961-1965	7	10	3	7	2	5	7	3	4	9
1956-1960	3	2	3	5	1	2	6	4	4	15
1951-1955	3	4	1	3	—	—	9	4	1	1
Prior to 1951	3	3	—	—	—	—	26	13	7	14

*Rebuilds include only modifications which significantly extended the useful life or increased the capacity of a machine.

Year Machine Installed Or Rebuilt*	W. No. Central		South Atlantic		E. So. Central		W. So. Central		Mountain & Pacific	
	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity
Total	32		159		85		95		138	
No Data Available	4		26		10		8		16	
Total Sample	28	100%	133	100%	75	100%	87	100%	122	100%
1986	—	—	6	7	7	14	7	12	—	—
1985	—	—	8	7	4	6	3	2	5	5
1984	—	—	6	5	3	5	5	3	7	7
1983	2	5	6	4	5	6	—	—	4	3
1982	1	13	5	4	4	10	5	10	5	7
1981	1	3	8	5	2	2	6	10	9	9
1980	2	4	7	5	6	8	2	3	6	8
1979	—	—	7	9	1	2	3	3	8	7
1978	1	3	9	9	1	1	3	3	5	3
1977	—	—	3	2	2	4	3	4	8	6
1976	2	5	4	4	1	1	4	2	6	2
1971-1975	4	18	19	10	13	15	9	13	13	14
1966-1970	4	16	16	12	7	14	17	20	13	7
1961-1965	7	18	9	6	8	4	7	8	17	12
1956-1960	1	5	7	3	5	4	4	3	3	2
1951-1955	2	6	4	4	1	1	4	2	5	6
Prior to 1951	1	4	9	4	5	3	5	2	8	2

*Rebuilds include only modifications which significantly extended the useful life or increased the capacity of a machine.



Fiber Sources for paper/paperboard/wood pulp manufacture

fiber consumption in paper & paperboard manufacture

Thousands short tons

	Total U.S.	Percent of Total Fiber	New England	Mid-Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain & Pacific	Location Not Determined
1987											
TOTAL FIBER	**77,374**	**100.0**	**5,314**	**5,203**	**11,754**	**1,503**	**19,118**	**10,646**	**11,981**	**11,855**	—
TOTAL WOOD PULP	58,153	75.2	3,924	2,799	6,264	915	15,928	9,344	10,305	8,675	—
Manufactured on-site	48,904	63.2	2,268	1,212	2,890	598	15,286	8,937	10,052	7,660	—
*Purchased	6,604	8.6	939	1,186	2,603	247	523	329	137	640	—
*Transferred	2,645	3.4	717	401	770	70	118	78	116	375	—
†TOTAL RECYCLABLE PAPER	18,901	24.4	1,307	2,371	5,434	568	3,181	1,280	1,607	3,152	—
Mixed Papers	2,116	2.7	176	332	611	116	384	195	125	179	—
Newspapers	3,143	4.1	149	675	713	57	468	81	136	863	—
Corrugated	9,177	11.9	393	665	2,479	325	1,922	791	811	1,790	—
Pulp Substitutes	2,902	3.7	440	438	788	52	392	194	321	276	—
High Grade Deinking	1,564	2.0	150	261	844	18	15	19	214	44	—
OTHER FIBERS	320	0.4	83	33	56	20	8	22	70	28	—
1988											
TOTAL FIBER	**80,164**	**100.0**	**5,683**	**5,440**	**12,076**	**1,637**	**20,021**	**10,823**	**12,279**	**12,129**	**76**
TOTAL WOOD PULP	60,063	74.9	4,262	2,860	6,406	1,036	16,592	9,452	10,553	8,826	—
Manufactured on-site	50,574	63.1	2,501	1,240	2,900	678	16,021	9,058	10,282	7,819	76
*Purchased	6,817	8.5	973	1,215	2,713	289	520	337	137	632	—
*Transferred	2,672	3.3	788	405	793	69	51	56	134	375	—
†TOTAL RECYCLABLE PAPER	19,770	24.7	1,339	2,536	5,612	581	3,420	1,349	1,659	3,273	—
Mixed Papers	2,180	2.7	177	341	642	118	405	194	118	185	—
Newspapers	3,227	4.0	156	703	746	60	482	81	137	861	—
Corrugated	9,747	12.2	405	750	2,532	331	2,106	850	869	1,905	—
Pulp Substitutes	2,901	3.6	445	457	749	56	413	204	305	273	—
High Grade Deinking	1,714	2.2	156	284	943	17	15	20	230	50	—
OTHER FIBERS	331	0.4	82	44	58	20	9	22	67	30	—
1989											
TOTAL FIBER	**82,843**	**100.0**	**5,853**	**5,525**	**12,447**	**1,726**	**20,539**	**11,393**	**12,743**	**12,408**	**209**
TOTAL WOOD PULP	61,600	74.4	4,341	2,850	6,559	1,116	16,815	9,782	10,922	9,004	—
Manufactured on-site	52,053	62.8	2,573	1,238	2,942	728	16,271	9,401	10,680	8,012	209
*Purchased	6,942	8.4	972	1,206	2,815	338	498	338	125	650	—
*Transferred	2,604	3.2	796	407	803	50	46	43	117	342	—
†TOTAL RECYCLABLE PAPER	20,894	25.2	1,415	2,631	5,830	589	3,715	1,589	1,753	3,374	—
Mixed Papers	2,248	2.7	184	353	654	118	425	198	119	197	—
Newspapers	3,371	4.1	163	688	782	62	559	92	138	888	—
Corrugated	10,491	12.6	448	822	2,637	340	2,264	1,058	964	1,969	—
Pulp Substitutes	2,984	3.6	465	477	745	51	453	212	312	269	—
High Grade Deinking	1,801	2.2	156	291	1,012	18	15	29	230	50	—
OTHER FIBERS	349	0.4	97	44	58	20	9	22	68	31	—
1990											
TOTAL FIBER	**86,395**	**100.0**	**6,036**	**5,680**	**12,922**	**1,869**	**21,384**	**12,069**	**13,245**	**12,905**	**285**
TOTAL WOOD PULP	63,681	73.7	4,420	2,869	6,694	1,249	17,299	10,327	11,224	9,315	—
Manufactured on-site	53,961	62.4	2,679	1,253	3,030	809	16,716	9,908	10,964	8,317	285
*Purchased	7,052	8.2	919	1,208	2,853	393	535	374	118	652	—
*Transferred	2,669	3.1	822	408	810	47	48	46	142	346	—
†TOTAL RECYCLABLE PAPER	22,359	25.9	1,519	2,765	6,167	600	4,076	1,720	1,952	3,560	—
Mixed Papers	2,445	2.8	190	373	693	127	450	215	122	276	—
Newspapers	3,643	4.2	167	729	805	63	776	96	145	862	—
Corrugated	11,186	13.0	512	882	2,768	345	2,339	1,153	1,095	2,092	—
Pulp Substitutes	3,153	3.7	491	487	786	48	493	227	343	279	—
High Grade Deinking	1,932	2.2	159	294	1,114	19	19	29	247	52	—
OTHER FIBERS	355	0.4	97	46	61	21	9	22	69	31	—

*Comprises all dried, wet lap or slush pulp not produced on-site including transfers from company owned or affiliated mills.
†Includes construction grades and molded pulp products.

fiber consumption in paper & paperboard manufacture (continued)

Thousands short tons

	Total U.S.	Percent of Total Fiber	New England	Mid-Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain & Pacific	Location Not Determined
1991											
TOTAL FIBER	90,004	100.0	6,131	5,702	13,327	2,042	22,729	12,739	13,733	13,250	350
TOTAL WOOD PULP	66,622	74.0	4,481	2,872	6,931	1,413	18,451	10,918	11,631	9,575	—
Manufactured on site	56,760	63.0	2,756	1,253	3,175	944	17,753	10,610	11,349	8,570	350
*Purchased	7,014	7.8	896	1,211	2,932	421	525	265	118	646	—
*Transferred	2,848	3.2	829	408	824	47	173	43	164	359	—
†TOTAL RECYCLABLE PAPER	23,025	25.6	1,552	2,784	6,336	609	4,268	1,799	2,034	3,644	—
Mixed Papers	2,471	2.7	196	375	698	128	451	222	123	280	—
Newsgrades	3,724	4.1	182	732	822	63	812	97	145	872	—
Corrugated	11,571	12.9	512	894	2,797	353	2,487	1,216	1,151	2,162	—
Pulp Substitutes	3,225	3.6	504	489	813	48	499	235	360	279	—
High Grade Deinking	2,033	2.3	159	294	1,207	19	19	29	255	52	—
OTHER FIBERS	357	0.4	98	46	61	21	10	22	69	31	—

pulpwood consumption in wood pulp manufacture

Thousands of CORDS

1987											
TOTAL PULPWOOD	90,266	100.0	4,963	2,076	5,211	975	28,456	16,604	15,649	16,332	—
Roundwood &											
Roundwood Chips	54,243	60.1	3,929	752	4,081	867	19,015	12,102	9,917	2,581	—
Forest Residues	4,204	4.7		64	300	41	1,132	569	1,368	630	—
Manufacturing Residues	31,818	35.2	1,033	260	730	67	8,309	3,933	4,364	13,121	—
1988											
TOTAL PULPWOOD	93,259	100.0	5,198	2,178	5,218	1,096	29,659	16,847	16,006	16,938	118
Roundwood &											
Roundwood Chips	56,089	60.2	4,095	1,831	4,070	996	20,009	12,163	10,049	2,896	80
Forest Residues	4,321	4.6		66	425	40	1,112	563	1,446	631	38
Manufacturing Residues	32,849	35.2	1,223	282	723	60	8,538	4,121	4,511	13,410	—
1989											
TOTAL PULPWOOD	95,406	100.0	5,317	2,184	5,346	1,133	30,234	17,153	16,542	17,175	323
Roundwood &											
Roundwood Chips	57,343	60.1	4,027	1,856	4,208	1,033	20,459	12,203	10,393	2,945	219
Forest Residues	4,442	4.7		66	427	40	1,097	691	1,449	568	104
Manufacturing Residues	33,620	35.2	1,290	262	711	60	8,679	4,258	4,699	13,661	—
1990											
TOTAL PULPWOOD	98,420	100.0	5,391	2,201	5,504	1,225	30,931	18,021	17,033	17,672	441
Roundwood &											
Roundwood Chips	59,060	60.0	4,127	1,872	4,334	1,122	20,978	12,851	10,550	2,927	99
Forest Residues	4,595	4.7		66	428	42	1,106	761	1,472	579	142
Manufacturing Residues	34,765	35.3	1,264	263	743	61	8,847	4,409	5,012	14,166	—
1991											
TOTAL PULPWOOD	102,599	100.0	5,512	2,201	5,595	1,452	32,605	19,121	17,534	18,037	543
Roundwood &											
Roundwood Chips	62,379	60.8	4,128	1,872	4,397	1,347	22,473	13,795	10,994	3,003	368
Forest Residues	4,734	4.6		66	444	44	1,122	768	1,494	622	175
Manufacturing Residues	35,487	34.6	1,383	263	754	61	9,011	4,557	5,046	14,412	—

*Totals not adjusted for rounding differences.

FIBER CONSUMPTION DEFINITIONS
1987 — Actual consumption
1988 — Best estimate based on year-to-date experience
1989-1991 — Consumption at capacity levels of production

Recyclable Paper Consumed in Paper & Paperboard Manufacture

actual consumption

Thousands short tons

END PRODUCTS	1987 Total	Mixed Papers	Newspapers	Corrugated	Pulp Substitutes	High Grade Deinking
TOTAL ALL GRADES	**18,901**	**2,116**	**3,143**	**9,177**	**2,902**	**1,564**
TOTAL PAPER	**5,194**	**77**	**1,591**	**290**	**1,842**	**1,394**
NEWSPRINT	1,386	—	1,386	—	—	—
PRINTING, WRITING & RELATED	1,318	—	—	12	970	336
PACKAGING & IND. CONVERTING	244	14	8	69	146	7
TISSUE	2,246	63	197	209	726	1,051
TOTAL PAPERBOARD	**12,798**	**1,687**	**1,274**	**8,658**	**1,011**	**168**
KRAFT, BLEACHED & UNBLEACHED	1,930	—	—	1,755	123	52
SEMICHEMICAL	1,747	46	—	1,645	56	—
RECYCLED	9,121	1,641	1,274	5,258	832	116
CONSTRUCTION PAPER & BOARD	**908**	**352**	**277**	**228**	**49**	**2**

Data on recyclable paper are collected in an industry-wide survey of paper and paperboard mills under the following definitions:
1987 — Actual consumption
1988 — Best estimate based on year-to-date experience
1989-1991 — Consumption at capacity levels of production

planned future consumption

Thousands short tons

END PRODUCTS	1988 Total	Mixed Papers	Newspapers	Corrugated	Pulp Substitutes	High Grade Deinking	1989 Total	Mixed Papers	Newspapers	Corrugated	Pulp Substitutes	High Grade Deinking
TOTAL ALL GRADES	**19,770**	**2,180**	**3,227**	**9,747**	**2,901**	**1,714**	**20,894**	**2,248**	**3,371**	**10,491**	**2,984**	**1,801**
TOTAL PAPER	**5,437**	**96**	**1,641**	**308**	**1,874**	**1,519**	**5,669**	**102**	**1,714**	**335**	**1,928**	**1,590**
NEWSPRINT	1,420	—	1,420	—	—	—	1,484	—	1,484	—	—	—
PRINTING, WRITING & RELATED	1,424	—	—	17	981	426	1,454	—	—	22	1,003	429
PACKAGING & IND. CONVERTING	243	13	7	69	148	7	256	11	7	69	163	7
TISSUE	2,350	83	214	222	745	1,086	2,475	91	223	244	762	1,154
TOTAL PAPERBOARD	**13,423**	**1,732**	**1,307**	**9,209**	**981**	**194**	**14,260**	**1,789**	**1,330**	**9,923**	**1,009**	**210**
KRAFT, BLEACHED & UNBLEACHED	2,108	—	—	1,931	108	69	2,413	—	—	2,206	128	79
SEMICHEMICAL	1,833	41	—	1,735	57	—	1,959	40	—	1,866	54	—
RECYCLED	9,482	1,691	1,307	5,543	816	125	9,888	1,749	1,330	5,851	827	131
CONSTRUCTION PAPER & BOARD	**910**	**353**	**278**	**231**	**46**	**2**	**966**	**358**	**328**	**232**	**47**	**2**

END PRODUCTS	1990 Total	Mixed Papers	Newspapers	Corrugated	Pulp Substitutes	High Grade Deinking	1991 Total	Mixed Papers	Newspapers	Corrugated	Pulp Substitutes	High Grade Deinking
TOTAL ALL GRADES	**22,359**	**2,445**	**3,643**	**11,186**	**3,153**	**1,932**	**23,025**	**2,471**	**3,724**	**11,571**	**3,225**	**2,033**
TOTAL PAPER	**6,250**	**199**	**1,923**	**359**	**2,050**	**1,718**	**6,456**	**202**	**1,979**	**361**	**2,104**	**1,811**
NEWSPRINT	1,758	77	1,680	—	—	—	1,804	80	1,725	—	—	—
PRINTING, WRITING & RELATED	1,503	—	—	22	1,033	447	1,537	—	—	22	1,063	452
PACKAGING & IND. CONVERTING	238	11	7	69	145	7	240	11	7	69	146	7
TISSUE	2,751	111	236	268	872	1,264	2,875	111	247	270	895	1,353
TOTAL PAPERBOARD	**15,111**	**1,864**	**1,387**	**10,592**	**1,054**	**213**	**15,557**	**1,885**	**1,411**	**10,967**	**1,075**	**220**
KRAFT, BLEACHED & UNBLEACHED	2,645	—	—	2,422	144	79	2,822	—	—	2,589	150	84
SEMICHEMICAL	2,156	44	—	2,058	54	—	2,277	44	—	2,180	54	—
RECYCLED	10,310	1,820	1,387	6,112	856	134	10,458	1,841	1,411	6,199	871	136
CONSTRUCTION PAPER & BOARD	**999**	**381**	**333**	**235**	**47**	**2**	**1,011**	**384**	**335**	**243**	**47**	**2**

Totals not adjusted for rounding differences

Recyclable paper for molded pulp included under Construction Paper & Board as follows: 1987, 207,000 tons; 1988, 209,000 tons; 1989-1991, 225,000 tons

Announced Capacity Expansion
New Mills & Machines

Expansion projects include new paper, paperboard and wood pulp mills and new paper and paperboard machines in existing mills. These projects have been publicly announced by the managements of the companies concerned and are included in the capacity estimates reported in this survey. Survey estimates also include confirmed expansion projects that have not been publicly announced which, in keeping with the confidential nature of the survey, are not included in this listing.

projects included in survey estimates

Thousands short tons

Grade	Annual Capacity	Proposed Start-up	Company & Location
Newsprint	245†	1990	Alabama River Newsprint Company Clairborne, AL
Newsprint	225†	1989	Newsprint South Inc. Grenada, MS
Newsprint	195†	1989	Ponderay Newsprint Company Usk, WA
Newsprint	230	1989	Southeast Paper Manufacturing Company Dublin, GA
Coated Groundwood	220 net*	1989	Blandin Paper Company Grand Rapids, MN
Coated Free Sheet	265	1990	Champion International Corporation Quinnesec, MI
Coated Free Sheet	125 net*	1988	Midtec Paper Corporation Kimberly, WI
Coated Free Sheet	100**	1988	Potlatch Corporation Cloquet, MN
Coated Free Sheet	N.A.	1990/1991	Scott Paper Company Skowhegan, ME
Uncoated Groundwood	240†	1987	Lake Superior Paper Industries Duluth, MN
Uncoated Groundwood	150	1991	Daishowa-America Company Ltd. Port Angeles, WA
Uncoated Free Sheet	300	1990	Boise Cascade Corporation International Falls, MN
Uncoated Free Sheet	290	1988	Georgia-Pacific Corporation Port Hudson, LA
Uncoated Free Sheet	200 net	1988/1989	International Paper Company South U.S.
Uncoated Free Sheet	240	1991	Union Camp Corporation Eastover, SC
Uncoated Free Sheet	255†	1990	Willamette Industries Inc. Bennetsville, SC
Tissue	80	1990	Chesapeake Corporation (Wisconsin Tissue Division) Menasha, WI
Tissue	45 net*	1990/1991	Fort Howard Paper Company Green Bay, WI
Tissue	N.A.† N.A. N.A.	1987 1988 1989	Fort Howard Paper Company Rincon, GA
Tissue	70	1989	FSC Paper Company Alsip, IL
Tissue	70	1988	James River Corporation Wauna, OR
Tissue	68†	1990	Kimberly-Clark Corporation Jenks, OK
Specialty Packaging Papers	59	1990	Consolidated Papers Inc. Stevens Point, WI
Special Industrial Papers	N.A.	1989	Hollingsworth & Vose Company Hawkinsville, GA
Unbleached Kraft Linerboard	350	1990	Gaylord Container Corporation Bogalusa, LA
Unbleached Kraft Packaging Paper	100	1990	Longview Fibre Company Longview, WA
Unbleached Kraft Folding	420	1991	Mead Corporation Mahrt, AL
Unbleached Kraft Linerboard	235 net*	1991	Union Camp Corporation Savannah, GA

**Will replace existing capacity. N.A. — Not Available. † New mill.*
***Gross increase, will replace unspecified existing capacity.*

Definitions And Grade Descriptions

PRACTICAL MAXIMUM CAPACITY: Practical Maximum Capacity, as defined in this survey, is the tonnage of paper, paperboard or pulp of normal commercial quality that could be produced with full use of equipment and adequate supplies of raw materials and labor, and assuming full demand. No allowance is made for losses due to unscheduled shutdowns, strikes, temporary lack of power, etc., which cause decreases in actual production but not in productive capacity. Capacity of paper machines which produce more than one grade is apportioned in accordance with actual production patterns or plans for future operation.

Capacity is reported in short tons of net finished paper and paperboard and air-dry (10% moisture content) pulp. Shrinkage of bleached or semibleached pulp is taken into account.

Annual practical maximum capacity — includes changes in capacity only for the portion of the year in which they are actually effective.

Year-end practical maximum capacity — assumes that all changes in capacity are in effect from the first day of the year in which they occur.

NEW MACHINES AND NET IMPROVEMENTS: Capacity increases or decreases are shown in two main groups: New Machines and Net Improvements.

New Machines — are defined as machines purchased or to be purchased from equipment manufacturers. Consequently, capacity changes resulting from transfers of paper machines from one mill to another are shown under Net Improvements.

Net Improvements — are defined as net changes resulting from modernization of machines, dismantling old machines, shifts in grades, etc.

Capacity increases from new machines are shown under New Machines for the first two years of operation (including the year of installation). Any additional capacity realized in a third or subsequent year is shown under Net Improvements.

MARKET PULP CAPACITY: Market pulp in this survey is defined as wood pulp produced in the U.S. for sale to pulp consumers. It excludes pulp for use or consumption by a producing mill or for shipment by a producing mill to other mills within its supply region which it owns, controls or with which it is affiliated. Shipments to owned mills outside the U.S. are defined as market pulp.

▶PAPER GRADES

NEWSPRINT: Paper used chiefly in the printing of newspapers, made largely from mechanical pulp and weighing not less than 28½ pounds nor more than 35 pounds (24 x 36 - 500).

UNCOATED GROUNDWOOD: Uncoated papers containing more than 10% groundwood or other mechanical pulps in their furnish, excluding newsprint.

MACHINE AND OFF MACHINE COATED: Bleached papers with a coating weight of at least 2½ pounds (25 x 38 - 500) on either side and at least 50% of the coating consisting of clay (Kaolin).

Coated Groundwood: Coated papers containing more than 10% mechanical pulp (mostly stone groundwood and/or refiner) in their furnish.

Coated Free Sheet: Coated papers containing 10% or less mechanical pulp (mostly stone groundwood and/or refiner in their furnish).

UNCOATED FREE SHEET: Bleached uncoated printing and writing papers containing not more than 10% groundwood or other mechanical pulps in their furnish; i.e., offset, tablet, envelope, business papers (bond, ledger, mimeo, duplicator) form bond, cover and text and related papers.

BLEACHED BRISTOLS: Includes tabulating index, tag and file folder, coated cover bristols, and uncoated bristols (index, printing, and postcard).

COTTON FIBER: Papers containing 25% or more in their furnish of cotton, cotton rags, cotton waste, linters, linter pulp, flax, or similar fibers.

THIN PAPERS: Includes carbonizing, condenser, cigarette, bible, and similar papers.

PACKAGING AND INDUSTRIAL CONVERTING: Wrapping paper, shipping sack, bag and sack other than shipping sack, and other converting papers — 18 pounds and over.

Unbleached Kraft: Paper containing more than 80% unbleached sulfate wood pulp. Wrapping paper, shipping sack, grocers sack and other bag, and other converting papers — 18 lbs. and over (24 x 36 - 500).

Bleached Packaging and Industrial Converting: Paper made for similar end uses as unbleached kraft, but made from bleached, and semibleached sulfate and unbleached sulfite pulps. Wrapping paper, shipping sack, grocers and other bag and sack, and other converting papers — 18 lbs. and over (24 x 36 - 500).

Specialty Packaging: Paper and board of all weights and furnishes, usually used as protective packaging for food and other consumer products, such as bakery bags, fast food and frozen food wraps. Also includes glassine, greaseproof and vegetable parchment paper.

Special Industrial: Paper and board, of all weights, calipers and furnishes, designed for specialized end uses and manufactured to exact customer specifications; includes abrasive paper, electrical insulation, filter paper and similar grades. Does not include wet machine board.

TISSUE: Includes sanitary grades: i.e., toilet, facial, napkin, toweling, sanitary napkin, wiper and special sanitary papers, and waxing, wrapping, wadding and miscellaneous grades.

▶PAPERBOARD GRADES

UNBLEACHED KRAFT PAPERBOARD: Paperboard made from a furnish containing not less than 80% wood pulp produced by the kraft sulfate process.

Linerboard: Unbleached kraft paperboard manufactured for use as facing material when combining paperboard for conversion into corrugated or solid fiber boxes. Includes solid unbleached kraft linerboard, both Fourdrinier and Cylinder, mottled white linerboard and clay coated unbleached kraft linerboard.

Folding: Paperboard manufactured, such as clay coated unbleached kraft and bleached lined unbleached kraft backed, for conversion into folding cartons and beverage carriers.

Other: All unbleached kraft paperboard whose end use is not otherwise classified, such as board for a filler for solid fiber board to be fabricated into a shipping container, tube, can, drum, file folder, tag, automotive panel, etc.

SOLID BLEACHED PACKAGING PAPERBOARD: Paperboard made for use in packaging from a furnish containing not less than 80% virgin bleached wood pulp. Bleached bristols not manufactured for packaging are included in the proper bleached bristol classification under papers.

Linerboard: Solid bleached paperboard, either Fourdrinier or Cylinder, manufactured for use as facing material when combining paperboard for conversion into corrugated or solid fiber boxes.

Folding: Solid bleached paperboard for conversion into folding cartons, such as folding cartons for ice cream, butter, oleomargarine, frozen foods, bakery products, cosmetics, drugs, etc.

Milk Carton and Food Service: Solid bleached paperboard for conversion into milk carton, heavyweight cup, and round nested food container, plate, dish and tray, and for packaging for moist, liquid and oily foods.

Other: Solid bleached paperboard for conversion into packaging of blister pack, tubes and other products not classified above and for industrial products not classified under bleached bristols.

SEMICHEMICAL PAPERBOARD: Paperboard made from a furnish containing not less than 75% virgin wood pulp, the pre-

dominant portion of which is produced by a semichemical process.

RECYCLED PAPERBOARD: Paperboard manufactured from a combination of recycled fibers from various grades of paper stock with the predominant portion of its furnish being recycled fibers: sometimes including a very minor portion of virgin fibers.

Linerboard: Recycled paperboard produced from a furnish containing less than 80% virgin kraft wood pulp and used as facing material when combining paperboard for conversion into corrugated or solid fiber boxes.

Corrugating Medium: Recycled paperboard produced from a furnish containing less than 75% virgin wood pulp and used as the fluting material when combining paperboard for conversion into corrugated boxes.

Container Chip and Filler Board: Recycled paperboard manufactured as a filler for solid fiber board for conversion into solid fiber boxes and other container chipboard (all chipboard under 26 pounds per 1000 sq. ft. manufactured for use as facing corrugated, solid fiber and single faced products which are used for interior packaging, e.g., pads, partitions, dividers, layers and cushioning).

Folding: Recycled paperboard manufactured with bending quality for conversion into folding cartons (including unlined chipboard, kraft lined, white lined and clay coated).

Set-up: Recycled paperboard manufactured with non-bending specifications for conversion into rigid or set-up boxes (including plain chipboard, newslined, white vat lined).

Gypsum Wallboard Facing: Recycled paperboard manufactured for use as liner or facing on gypsum board, plasterboard (includes white, cream, gray, blue and all colors).

Other: Recycled paperboard with the same characteristics as paperboard for bending packaging or non-bending packaging but not for non-packaging uses; plus recycled paperboard for end uses not otherwise classified, such as tag, file folder, tube, can, drum, match stem, tablet backs, toys, etc.

▶CONSTRUCTION PAPER & BOARD & OTHER

CONSTRUCTION PAPER: Sheathing paper, felts (roofing felts, floor covering, automotive felts, deadening, industrial, pipe covering, refrigerator), asbestos paper and asbestos filled paper, flexible wood fiber insulation.

WET MACHINE BOARD: Binders board, shoe board (e.g., counter board, heel board, innersole, etc.) automotive board, chair seat backing, coaster board, luggage, mill board, panel board, table top board, etc.

INSULATING BOARD: A fibrous-felted homogenous panel made by interfelting of the fibers (e.g., interior building board, wallboard, sound deadening board, acoustical tile, exterior sheathing board, roof insulation board, trailer board, etc.).

▶WOOD PULP

DISSOLVING & SPECIAL ALPHA: Highly refined bleached white sulfite or sulfate pulp with a high content of alpha (pure cellulose) fiber.

SULFITE PAPER GRADES: Paper grade pulps produced by the sulfite process. Bleached pulp must achieve a G.E. Brightness of more than 75.

SULFATE & SODA PAPER GRADES: Paper grade pulps produced by the sulfate or soda process. Bleached pulp must achieve a G.E. Brightness of more than 75. Semibleached pulp must achieve a G.E. Brightness of not less than 45 or more than 75.

SEMICHEMICAL: High yield pulps produced with the use of some chemical agent such as neutral sulfite (N.S.S.C.); alkaline cook; chemipulp (defibrated pulp put through reaction chambers); chemi-mechanical pulp with a yield usually above 60%.

MECHANICAL: Fine textured, usually bright pulps, used in paper and paperboard manufacture and produced by mechanical rather than chemical processes.

Stone Groundwood: Pulp produced by grinding wood logs or bolts (usually 4 ft. in length) into relatively short fibers.

Refiner: Pulp produced by subjecting wood chips and/or residues to atmospheric or open discharge refining.

Thermomechanical: A high-yield pulp produced by a thermomechanical process in which wood particles are softened by preheating under pressure prior to a pressurized primary refining stage. Usually replaces or reduces the chemical pulp component in newsprint or groundwood papers.

▶WOOD PULP FOR CONSTRUCTION PAPER & PAPERBOARD

Coarse, often brown, pulps used in the manufacture of insulating board and construction paper. Also includes similar pulps if used in the manufacture of wet machine board. Excludes pulp for hard pressed board.

Stone Groundwood and Refiner: Pulps produced by the stone groundwood or refiner processes but used in the manufacture of construction paper and board.

Defibrated/Exploded: Pulps produced by subjecting wood chips to preheating and pressurized refining. Similar to the thermomechanical process except that operating variables produce an economical, coarse brown pulp suitable only for construction paper and board.

Screening: Rejects and off-quality screenings from all grades of wood pulp except dissolving.

▶FIBERS

Roundwood: Comprises roundwood bolts and logs (4 feet or longer, including tree lengths) brought to the pulpmill for chipping, or chips made from primary roundwood bolts and logs at a chipmill, remote from the pulpmill.

Forest Residues: All logging residues such as portions of bolts or logs less than the minimum diameter specified by the consuming mill and poles, saplings, slash, limbs, twigs, or portions of bolts or logs not regarded as merchantable in normal pulpwood or sawlog operations. May also include merchantable portions of trees that will not be used for higher value products. Chips made from forest residues.

Manufacturing Residues: All mill residues such as slabs, edgings, trimmings, cores, planer shavings, sawdust or other wood residues of a wood manufacturing process and chips made from these residues.

Other Fibers: Cotton linters, cotton linter pulp, textile mill waste and cuttings; rags, waste rope and cordage, bagasse, flax, straw, jute, esparto, kenaf and all other vegetable fibers used in paper and paperboard manufacture.

▶RECYCLABLE PAPER

Mixed Papers: Number 1 and 2 mixed papers, super mixed papers, boxboard cuttings, mill wrappers.

Newspapers: Number 1 news, over-issue news, super news. Any grade to be used as a news substitute.

Corrugated: Old containers both corrugated and solid fiber, container plant cuttings.

Pulp Substitutes & High Grade Deinking: Includes ledger, tabulating cards, bleached sulfate shavings (unless used as a news substitute). Envelope and bleached sulfite and sulfate cuttings, coated book stock, news and publication blanks, kraft paper and bags and all other grades not classified above.

Print free grades are reported as *Pulp Substitutes* and printed grades, if deinked, are reported as *High Grade Deinking*.